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Three Essays on the Impact of Institutions and Policies on Socio-Economic Outcomes

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Summary

This thesis consists of three self-contained essays. It examines the impact of institutions and cross-border policies on socio-economic outcomes.

The first essay focuses on the impact of religiosity, general and political trust, local participation, and welfare metrics on well-being in rural areas using the Ethiopian Rural Household Survey. Ordered probit methods reveal distinctive determinants of overall life satisfaction and momentary happiness. Broader socio-economic factors such as religiosity and political governance strongly predict life satisfaction, while largely welfare metrics drive momentary happiness.

The second essay studies the determinants of cross-border flows of people for tourism, personal, or business purposes with a particular emphasis on the role of visa policies using instrumental variable estimation for outbound travel to a cross-section of countries for 2005 and 2010. We adopt the UN General Assembly Affinity Index, a measure of the quality of bilateral relations between nations, to instrument for bilateral visa policy. The affinity index explains 22% of the variation in visa policies in both 2005 and 2010. We find that, *ceteris paribus*, imposing visa reduces travel by about 80% and 73% in 2005 and 2010 respectively implying restrictive visa policies discourage cross-border travel significantly. We also find an adverse impact of restrictive visa policies on travel and tourism-related revenues and employment.

The third essay addresses the role of the United States Visa Waiver Program (VWP) on inbound travel. We employ Difference-in-Difference (Diff-in-Diff) estimation on panel data in respect of US inbound travel from eight countries newly admitted to the program in 2008, versus several comparison (control) groups including ten aspirant - so-called 'roadmap' - countries in the process of negotiation at the same time. We also restrict the treatment and comparison groups to Europe to reduce potential bias arising from heterogeneity and unobserved country characteristics. Treating the policy as a quasi-natural experiment allows a neater identification of the impact of visa policies on travel. We conclude, *ceteris paribus*, admitting a country to the program increases inbound travel from that country to the US by 29% to 44%.

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Abbreviations

CEPII	Centre d'Etudes Prospectives et d'nformations Internationales
CIA	Central Intelligence Agency
DHS	Department of Homeland Security
Diff-in-Diff	Difference-in-Difference
DLDP	District-Level Decentralisation Program
ECOWAS	Economic Community of West African States
EOC	Ethiopian Orthodox Church
ERHS	Ethiopian Rural Household Survey
ESTA	Electronic System for Travel Authorization
FDI	Foreign Direct Investment
GATT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
INA	Immigration and Nationality Act
IV	Instrumental Variable
NGO	Non-Governmental Organisations
OLS	Ordinary Least Square
SD	Standard Deviation
SNNPR	Southern Nations, Nationalities, and Peoples Region
SWB	Subjective Well-being
UK	United Kingdom
UN	United Nations
UNWTO	United Nations World Tourism Organization
US	United States
USD	United States Dollar
VWP	Visa Waiver Program
VWPP	Visa Waiver Pilot Program
WTO	World Trade Organization
WTTC	World Travel & Tourism Council
WVS	World Values Survey

Chapter 1

Introduction

1.1 Institutions and Socio-economic Outcomes

The economics of growth literature has identified institutions, trade, geography and climate as the deep determinants of economic performance. The conventional wisdom is that they affect economic outcomes by influencing the proximate determinants of economic growth, namely factor accumulation and technological progress. Studies that highlight the importance of institutions include North (1989), Acemoglu et al. (2000), Acemoglu et al. (2002), Hall and Jones (1999), and Rodrik et al. (2004). Sachs et al. (1995) and Frankel and Romer (1999) among others emphasise the role of trade; while proponents of geography and climate include Gallup and Sachs (2001), Sachs and Warner (2001), and Sachs (2003). While the relative importance of each determinant has been debated, the majority of research has gravitated to the primacy of institutions over geography, climate, and trade (Rodrik et al., 2004; Acemoglu and Robinson, 2010).

Douglas North defines institutions as "rules, enforcement characteristics of rules, and norms of behaviour that structure repeated human interaction." (North, 1989, p. 1321). Hence, institutions involve both formal rules such as constitutions, statutes and common laws, and contracts; and informal constraints (norms) such as codes of conduct, taboos, and standards of behaviour. North (1989) argues that there is a bidirectional relationship

between the formal and informal aspects of institutions. On the one hand, norms and other forms of informal constraints are partly derivatives or extensions of formal rules (see also Acemoglu (2008), Nunn and Wantchekon (2009)). On the other hand, the informal institutions are partly shaped and moulded by organised ideologies such as religions, and social and political values. Once formed, the informal norms and constraints play a crucial role in the evolution of formal institutions through time (see also Aghion et al. (2010) for a bi-directional relationship between trust and formal institutions).

Bardhan (2005) states that the plethora of recent research on the role of institutions on economic performance focuses only on very limited types of institutions, mainly property rights due to the difficulty of quantifying the effect of other institutions. Moreover, the main practise in recent economic research has been bundling institutional measures into an index and exploring the effect on the aggregate economy. While such a practise provides an overall correlation between institutional qualities and economic performance, it does not inform in detail how institutions evolve and affect the economy. While Acemoglu et al. (2005b) assert that the quality of institutions is at the heart of economic development, social science research has yet to explain the mechanism through which institutions persist or change.

To better understand the mechanism by which institutions matter for socio-economic outcomes, some researchers focused on specific aspects of institutions and economic outcomes. For example, Eichengreen and Iversen (1999) and Nickell and Layard (1999) focused on labour market institutions and economic performance; Banerjee and Iyer (2005) focused on historical land tenure system and its effect on economic performance in rural India; Acemoglu et al. (2005b) categorise institutions into "property rights institutions" and "contracting institutions" and explore their effect on various measures of economic performance. Similarly, Bhattacharyya (2009) using Rodrik's (2005) categorisation of institutions into market creating, market stabilising, market regulating, and market legit-

imising finds varying impacts of each on economic growth. Unbundling institutions and studying their effects on various aspects of socio-economic matters helps to understand better the mechanism at work.

In the first essay of this thesis, we focus on micro aspects of institutions and their impact on selected socio-economic outcomes. The micro aspect relates to mainly informal institutions and their impact on well-being in rural areas. It focuses on the role of religiosity, general and political trust, and local participation on subjective well-being (SWB) using the Ethiopian Rural Household Survey (ERHS). The role of welfare metrics such as consumption and livestock ownership in SWB is also explored.

In recent years, there has been increasing interest in research on the role of religiosity, rather than the religious denomination per se, and social capital on economic outcomes.[1] Putnam (2001) and Sacerdote and Glaeser (2001) view places of worship as important civic Organisations in the sense that networks and interactions fostered by churches are important elements of social capital, which, when productive, have a positive impact on growth. Tabellini (2010) finds that historical, cultural attributes such as trust strongly predicted current economic performance. On the downside, Barro and McCleary (2003) argue that given religious beliefs, an increase in church attendance signifies a decline in productivity of the religion sector as more resources in terms of time and goods are consumed for a given output (belief).

Religious institutions and religiosity can also affect well-being directly. Social support and the positive emotions created by religious participation lead to physical health through reduced immune system suppression (Koenig et al., 1998; Myers, 2000). Religious institutions bring people together which strengthens their bonds creating a sense of solidarity in times of crisis (McIntosh et al., 1993). Moreover, in societies where social safety nets

[1]Religiosity reflects the degree of religious involvement and belief. It is often measured by the religious participation of individuals, for example attending religious services or the extent of belief in God, and the frequency of prayers. See McCleary and Barro (2006) for the various measures of religiosity.

are absent, religious institutions create social security by encouraging sharing and mutual support (Frey and Stutzer, 2002; Inglehart, 2010).

Utility functions of religious people can systematically differ from those of less religious or non-religious as the former takes after-life gains from religiosity into account. This can have implications on aspirations and hence an impact on the work behaviour, consumption and wealth patterns of individuals. In this thesis, we focus on the first part of the story - whether religiosity impacts current happiness and life satisfaction differently. Future research can then explore whether religiosity affects economic status, (i.e. consumption and income) through the aspiration channel.

Trust is another important factor for well-being. Trust is regarded as a crucial component of social capital specially in areas where formal institutions are not developed. It plays an important role in enforcing agreements, improving access to credit, and facilitating investment (Fafchamps, 1996; Fafchamps and Minten, 2002; Knack and Keefer, 1997). Several studies have found a direct positive effect of trust on subjective well-being (see, for example, Bjørnskov (2003), Helliwell (2003), Helliwell et al. (2004)).

Political trust and participation can raise subjective well-being in at least two possible ways (Frey and Stutzer, 2000). Firstly, an increased participation of citizens in government activities means their wishes and interests are reflected in public decision making as they can better monitor and control politicians. Secondly, an increased voice of citizens in local political institutions means politicians and administrators have better information regarding preferences of residents, and this enhances well-being.

Our analysis reveals that religiosity, general trust, confidence in the local political administration, and participation in formal and informal institutions are strongly and positively associated with SWB in addition to standard economic variables. From a methodological point of view, the results indicate happiness responses tend to reflect welfare metrics; while responses to general satisfaction questions indicate that respondents evalu-

ate their overall status of well-being taking into consideration broader socio-economic and institutional characteristics. Hence, happiness and general life satisfaction data convey related, yet distinctive information. The differential impact of institutions on life satisfaction and momentary happiness is in comport with the propositions of Deaton (2008) and Stevenson and Wolfers (2008) that life satisfaction and happiness are not synonymous.

1.2 Political Economic Policies and Cross-Border Travel

The travel and tourism sector is a fast-growing sector in many economies. In 2013, including the direct and indirect contributions, the share of travel and tourism expenditures to GDP and employment was 9.5% and 8.5% respectively worldwide (WTTC, 2014). In addition to the direct contribution to revenue and employment, the travel and tourism sector can play an important role in fostering trade in goods and other types of services by reducing information asymmetry between potential traders in the countries of origin and destination.[2]

The literature on growth and productivity has focused on the role of aggregate trade and foreign direct investment as conduits for technology transfer. The role of imports (Coe and Helpman, 1995), exports (Clerides et al., 1998), and foreign direct investment (De La Potterie and Lichtenberg, 2001) on technology diffusion are some examples of studies on cross-border knowledge transfer.

Another plausible channel of technology transfer is the physical contact of people. Inbound and outbound cross-border travel of people can facilitate technology diffusion. This is especially true as some aspects of technology are not fully coded, and hence easier when exchanged interpersonally face-to-face than written or broadcast. Arrow (1969) argued that lack of personal contact outside a country's territory could be an important

[2]For the relationship between immigration and trade see, for example, Gould (1994), Herander and Saavedra (2005), Bandyopadhyay et al. (2008), and Ghatak et al. (2009).

impediment to technology adoption. Frankel and Romer (1999) emphasise the informal exchange of ideas as an important income-enhancing factor along with trade. Andersen and Dalgaard (2011) argue that cross-border interaction of people plays a significant role in the diffusion of knowledge and technology. Another potential benefit of cross-border travel is a favourable attitude towards people of other countries which can further positively affect cross-border trade and other economic ties. For example, Amir and Ben-Ari (1985) found that Israelis' negative attitude towards Egyptians changed after visiting Egypt.[3] Hence, studying the determinants of cross-border travel can inform policy makers on ways of boosting links among people and countries of the world.

The second and third essays of this thesis focus on the main institutional barrier to cross-border travel, namely visa policy. Despite visa policies being the main institutional tools for countries to control inflows of foreigners, research on the extent of their impact on cross-border travel is scarce. The second essay studies the determinants of cross-border flows of people for tourism, personal, or business purposes that have been from at least one night up to one year with a particular emphasis on the role of visas. Visa policies are potentially endogenous due to unobserved common factors affecting both visas and travel. We use the United Nations General Assembly Voting Affinity Scores (Voting Affinity Scores) to instrument for visas. The affinity scores reflect the voting behaviour of member states in voting at UN general assemblies and are widely used in political science and international relations to measure the quality of the bilateral relationship between countries. As such they reflect preferences of states about foreign policy. The similarity of voting can reflect the quality of the bilateral relationship between countries and hence can directly affect visa policies while there are no theoretical or empirical grounds to think that voting behaviour is systematically related to income. We use the Heckman two-step

[3]The literature on the impact of tourism on attitude is not conclusive. For instance, Pizam et al. (1991) found that a group of US students who visited Russia did not change their opinion after the visit compared to a control group who did not take part in the visit.

procedure to correct for potential selection bias due to the presence of a large number of zeros in the bilateral travel data.

We find, *ceteris paribus*, imposing visa restriction reduces travel flows by about 80% and 73% in 2005 and 2010 respectively. This suggests that restrictive visa policies decrease cross-border travel significantly. We find consistent results with Poisson and Zero-Inflated Poisson models. In economic terms, we find that restrictive visa policies adversely affect travel and tourism-related revenues and employment. Moreover, the study reveals that the quality of bilateral foreign relations between countries, measured by the similarity of voting in the UN General Assembly, predicts 22% of the variation in bilateral visa policies depending on the specification.

In the third essay, we address the role the United States (US) Visa Waiver Program (VWP) plays in inbound travel. We employ Diff-in-Diff estimation with panel data on US inbound travel from eight countries newly admitted to the program in 2008, versus several comparison (control) groups. The comparison groups include ten aspirant - so-called 'roadmap' - countries in the process of negotiation at the same time; the rest of the world, which are not in the VWP; and the rest of the world excluding those admitted in 2008.[4] We also restrict the treatment and comparison groups to countries in Europe to reduce potential bias of estimates arising from heterogeneity and unobserved country characteristics. We conclude that, *ceteris paribus*, admitting a country to the program increases inbound travel from that country to the US by between 29% and 44%. Our results also suggest a mild persistent effect of the program over time.

[4]The eight countries admitted to the VWP in 2008 were the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Slovakia, and South Korea. The 'roadmap countries' in 2008 were Argentina, Brazil, Bulgaria, Cyprus, Israel, Malaysia, Poland, Romania, Turkey, and Uruguay.

Chapter 2

Subjective Well-being and Institutions: The Case of Rural Ethiopia

2.1 Introduction

Research on subjective well-being (SWB), mainly conducted through surveys on overall life satisfaction and happiness, complements the conventional measures of well-being such as the level of consumption, income, and wealth. It can inform policy makers about economic and other factors that society values most. The increased availability of SWB data and empirical evidence of a high correlation with the conventional measures of well-being has spurred an increased use of such information by economists in recent years (Krueger and Schkade, 2008).[1]

Research on the determinants of SWB has mainly focused on either cross-country or within-country analysis of developed and transition countries. The study on SWB for developing countries, however, remains limited. Developing countries, especially their rural parts, exhibit several distinctive features and merit separate treatment to understand determinants of well-being in these areas of the world. Some of the distinguishing char-

[1] In this thesis, unless specified SWB refers to both life satisfaction and momentary happiness.

acteristics of rural communities include more interdependence among rural community members, higher levels of religiosity and the importance of informal institutions.

People in developing countries, especially in rural areas, are more religious as shown by various editions of the World Values Surveys. Hence, the role of religion in well-being would be more apparent in these areas. In religious societies, it is quite tenable to assume that people are concerned both about their current and expected after-life status when evaluating their overall well-being.[2] Hence, in a rural religious context, the concepts of life satisfaction (potentially taking into account worldly experience and the expected after-life utility) and momentary happiness (usually associated with hedonic experiences) can have different implications. The distinction between life satisfaction and happiness outcomes in a rural context can give insights into the mechanisms through which religious and other institutions affect well-being.

Furthermore, rural communities have developed a network of informal institutions such as funeral associations and friendly societies based on religion or geographic proximity with direct implication for well-being. Due to the absence of formal institutions, informal institutions often based on trust and custom play a crucial role in rural life. Hence, in the absence of a strong formal judiciary system coupled with informational asymmetries, trust in individual and community engagement is important and can have strong implications for well-being (See, for example, Fafchamps (1996), Bigsten et al. (2000), and Fafchamps and Minten (2002)).

This essay attempts to contribute to the study of the determinants of SWB in poor, vulnerable areas using data from a rich survey in rural Ethiopia. We pay particular attention to the role of religious and political institutions as well as informal institutions such as general trust. Religious attendance brings people together and strengthens their bonds, which creates a sense of solidarity in times of crisis due to idiosyncratic or covariate

[2]See, for example, Azzi and Ehrenberg (1975) for the determinants of religious participation.

shocks. In societies where social security is absent, religious institutions create informal social security by encouraging sharing and mutual support. In areas where formal institutions are not developed, general trust plays a significant role in enforcing agreements, improving access to credit, and facilitating investment. In rural communities in developing countries, local administrations are in involved in managing agricultural land distribution, agricultural extension, and safety nets among others. Hence, trust in local political institutions and participation can affect the well-being of households. Using ordered probit models, we estimate life satisfaction and happiness equations for rural areas to inform on the issues alluded to above.

Our analysis reveals that religiosity, general trust (trust on people), confidence in the local political administration (political trust), and participation in formal and informal institutions are strongly and positively associated with well-being in addition to standard economic variables. We find evidence for distinctive determinants of life satisfaction and happiness. Broader socio-economic factors such as religiosity and the quality of political governance strongly correlate with satisfaction while mainly welfare metrics drive happiness.

The chapter is organised as follows. Section 2.2 reviews related literature. Section 2.3 provides an overview of social and political institutions in Ethiopia. Section 2.4 describes the data and presents some descriptive analysis. The econometric model is outlined in section 2.5. Section 2.6 presents the results and an accompanying discussion. Finally, Section 2.7 offers some concluding remarks.[3]

2.2 Review of Literature

Potential determinants of SWB identified by existing research include:

[3]The statistical softwares used to estimate the models in this chapter are LIMDEP/NLOGIT V.4 (Greene, 2007) and Stata 13 (StataCorp, 2013).

- income (absolute and relative),
- personal characteristics (age, gender, and personality),
- social development (education, health, and employment),
- family (marital status and number of children),
- social capital (community activities, religious involvement, and trust), and
- macroeconomic conditions (income inequality, inflation, welfare, and institutions).

Research has uncovered varying evidence on these factors (for example, see Frey and Stutzer (2002) and Dolan et al. (2008) for more detailed reviews of the determinants of SWB). This review focuses on selected major determinants.

The link between income and SWB has been at the centre of well-being research. Cross-sectional studies across countries reveal people in richer countries are on average more satisfied than people in poorer countries. Similarly, cross-sectional studies within countries show that more affluent individuals are more satisfied on average than their poorer counterparts. Moreover, most studies find a concave relationship between income and SWB indicating decreasing marginal returns of well-being from income (Easterlin, 2001; Frey and Stutzer, 2002; Blanchflower and Oswald, 2004; Diener et al., 1995).

On the other hand, there is less agreement on the relationship between income and SWB in papers that utilise time series and panel data. For example, Easterlin (1974) and Smith (1979) for the US, and Easterlin (1995) for the US, Japan, and nine European countries find no relationship between growth in income and SWB. The phenomenon of economic gains not buying life satisfaction or happiness is known as the *'Easterlin Paradox'*. Studies that broadly support this paradox in the sense that economic gains affect well-being slightly or only up to a certain point (until basic needs are fulfilled) include Oswald (1997), Blanchflower and Oswald (2004), Layard (2005), and Diener and Seligman

(2004). The main factors that give rise to the 'Easterlin Paradox' are the importance of relative income, adaptation to higher income, and the rise of aspirations with income.

Other studies have refuted the 'Easterlin Paradox' claiming that there is a positive relationship between own income and reported well-being. Studies such as Deaton (2008), Stevenson and Wolfers (2008), and Sacks et al. (2012) argue the availability of broader data sets for more countries and over longer time spans have helped uncover a positive relationship between income and well-being across and within countries through time.

Clark et al. (2008) assert that income can be measured relative to others (*social comparison*) and relative to ones past income (*habituation*), and incorporating these into a utility function can explain the Easterlin Paradox. On the other hand, Veenhoven (1991) attempts to explain partially the Easterlin paradox by reference to what he calls *'contentment'*, instead of '*comparison to others*'. He argues income yields higher satisfaction up to a point after which people become contented, and hence additional income may not lead to any further enhancement in satisfaction.

Research on the role of economic factors on SWB has focused on developed countries and the transition economies of Eastern and Central Europe. Only a handful of papers studied SWB in developing countries. Kingdon and Knight (2007) using the 1993 South African national household survey find support for a positive role of absolute income on SWB, but a mixed role for relative income. They find that the income of close neighbours surprisingly affects SWB positively, which is in contrast to findings in developed countries; but can be explained by risk sharing and solidarity behaviour in poorer communities. Using surveys of two separate villages in Northern Ethiopia Akay and Martinsson (2011) and Akay et al. (2012) studied the role of '*positional concern*' using experimental methods and find no evidence for the existence of positional concern as defined by the income of others in the community.[4] Similarly, Asadullah and Chaudhury (2012) find a stronger effect

[4] *Positional concern* refers to the degree to which individuals compare their income or consumption to

of absolute income on SWB than relative measures for rural Bangladesh. Ravallion and Lokshin (2010) find little support for positional concern (measured by relative deprivation) for most poor households in Malawi with the exception of the relatively well-off. On the other hand, Knight et al. (2009) find a stronger effect of relative income compared to own past income and the income of others than for own income in explaining SWB in China using the 2002 national household survey. Therefore, the majority of the studies in poorer countries find a relatively stronger effect of absolute income compared to relative income.

In addition to economic factors, social and institutional aspects that matter to well-being include religious involvement, general trust, political trust (governance), and family (marital status). Weber (1904) provides an analysis of the impact of religion on economic development. Religion potentially influences economic performance through the development of personal traits such as trust, honesty, thriftiness, openness to strangers, and work ethic among others, all of which enhance productivity.

Putnam (2001) and Sacerdote and Glaeser (2001) view places of worship as important civic entities where networks and interactions fostered by religious centres are vital elements for the development of social capital, which could positively impact growth. On the downside, Barro and McCleary (2003) argue that, given religious beliefs, an increase in church attendance reflects a decline in productivity of the religion sector as more resources in terms of time and goods are being consumed.

Religious people tend to be healthier, on average, due to reduced drinking, smoking and promiscuity (Jarvis and Northcott, 1987; McCullough et al., 2000). Hence, religion can result in a higher level of well-being through its impact on health. Moreover, other aspects of religiosity such as social support and positive emotions lead to physical health through reduced immune system suppression (Koenig et al., 1998; Myers, 2000). In addition, to

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other reference groups. Hence, it implies that the utility a person gets from a certain income level or consumption not only depends on the absolute level but also relative to others (See, for example, Akay et al. (2012))

an indirect effect through income and health research has found a direct link between religion and well-being (Frey and Stutzer, 2002). Literature in psychology, sociology and economics identify several attributes of religion that enhance well-being.

Religious attendance brings together people and strengthens their bonds, which creates a sense of solidarity in times of crisis such as the loss of a spouse or child or during old age (for example, see Moberg and Taves (1965) as cited in Deiner et al. (1999); and Harvey et al. (1987) as cited in Myers (2000); McIntosh et al. (1993)). In societies where social security is absent, religious institutions create social security by encouraging sharing and mutual support (Inglehart, 2010). Lim and Putnam (2010) use panel data for the US, and find that religious people are more satisfied because they build social capital through their frequent attendance at churches.

Religion provides hope and an ability to cope with adverse circumstances by attributing events to the *'will of God'*, and provides purpose and meaning of life in times of stability and security (for example, see (Pollner, 1989; Ellison, 1991; Frey and Stutzer, 2002; Inglehart and Norris, 2004).

Trust is another important factor enhancing well-being. Trust is regarded as a crucial component of social capital (Coleman, 1988; Putnam, 1993). In areas where formal institutions are not developed trust plays a significant role in enforcing agreements, improving access to credit, and facilitating investment. Using data for 29 market economies, Knack and Keefer (1997) finds a strong positive effect of trust on economic performance. Similarly, Fafchamps and Minten (2002) find that agricultural traders in Madagascar with larger networks are significantly more productive than less connected traders. Fafchamps (1996) finds that compliance with contractual obligations is mainly driven by a mutual trust for Ghanaian manufacturing and trading firms.

Furthermore, through its effect on the economy, trust can directly affect well-being. In a cross-country study of 32 nations from Europe, the Americas, and Asia, Bjørnskov

(2003) estimates the effect of social capital changes on satisfaction as equivalent to a halving of inflation or increasing per capita income by as much as 25%. Using three waves of the World Value Survey (WVS) data for groups of countries mainly consisting of developed and transition economies, Helliwell (2003) finds a positive impact of individual trust level even after controlling for national levels of trust. Helliwell et al. (2004), using cross-country and national surveys, find a positive effect of trust on SWB directly and through enhancing physical health. This is consistent with Berkman and Syme (1979), who find community and social ties improve physical health.

The direct and indirect role of social capital in general and trust, in particular, are likely to be even higher in poorer countries where formal institutions are either absent or weak (Fafchamps, 1996; Bigsten et al., 2000; Fafchamps and Minten, 2002). However, empirical research on developing countries on this subject is small. Asadullah and Chaudhury (2012) find a positive impact of general and institutional trust on SWB in rural Bangladesh.

Political governance and the efficacy of political institutions is another factor that can affect well-being. The effect can be indirect through its impact on income as confidence in institutions affects investment and asset building. It can also directly influence the subjective well-being of people as local political institutions exert a direct involvement in rural households including through land and fertiliser distribution.

The role of institutions in the economy has received significant attention from researchers in recent years (see, for example, North (1994) and Acemoglu et al. (2000)). On the other hand, the link between institutions and SWB remains largely unexplored. Hudson (2006) finds a positive role of institutional trusts such as in national government, European Central Bank, the UN, and the law on SWB. Helliwell (2006) finds the quality of governance as one of the predictors of cross-country difference in SWB. Similarly, Diener and Diener (2009) using data for 55 countries find that political freedom is one of the explanations for cross-country differences in SWB. At the local level, Frey and Stutzer

(2000) find political participation rights leads to higher SWB in Switzerland. In contrast, Veenhoven (2000) finds that political freedom is associated with higher SWB in richer but not poorer countries.

The handful of studies on the impact of political institutions on SWB is either based on cross-country analysis comprised of predominantly developed countries, or national level studies in advanced economies. Research on the evolution of institutions and SWB in developing countries is merited to understand the mechanism through which political institutions matter for SWB.

The role of marital status is one of the factors on which the literature reports consistent results. The majority of studies find married people reporting higher satisfaction levels than single, divorced, or widowed individuals (see, for example, cross-country studies such as Headey et al. (1991) and Gohm et al. (1998); and country case studies such as Carroll (2007) for Australia, and Asadullah and Chaudhury (2012) for Bangladesh). Some studies have expressed concern of reverse causality, as happy people are likely to get married and remain so (Veenhoven, 1989; Lucas et al., 2003)

Other factors identified in the literature as determinants of SWB are education, health, age, and gender. Blanchflower and Oswald (2004) for the US and UK, and Litchfield et al. (2012) for Albania, for example, find a positive role for education. Ferrer-i Carbonell and Frijters (2004) find a positive role for education for the eastern part of Germany (poorer), but no impact for the richer western part. Health status has been one of the widely studied factors in well-being in general and SWB in particular. The literature finds a strong positive relationship between self-rated health status and SWB (Palmore and Luikart, 1972; Mahudin et al., 2012). On the other hand, the link between objectively measured health status (reports by physicians of individuals) and SWB is either weaker though positive, or not significant at all (Ravallion and Lokshin, 2002; Deaton, 2008; Litchfield et al., 2012). Cross-sectional empirical studies in economics have found a 'U'

shaped relationship between age and SWB (See, for example, Blanchflower and Oswald (2004)). The role of gender on SWB is mixed. For example, Alesina et al. (2004) and Litchfield et al. (2012) find women report higher well-being levels. However, Alesina et al. (2004) find men being happier than women, and Ravallion and Lokshin (2002) find no effect for gender.

To sum up, the last decade has witnessed a proliferation of research on SWB. However, most studies have focused on developed countries, and the main subject has been the role of income and relative income on SWB. SWB research in developing countries remains scant, and the handful of studies focus mostly on the role of income. The role of formal and informal institutions such as religion, religiosity, trust in the general public (people) and government, and participation on well-being have not been adequately studied (see Table 2.1 for a list of papers reviewed in this chapter that deal with the determinants of SWB and whether they address the issue of institutions or not). Moreover, most studies of SWB published in economics journals do not make a clear distinction between life satisfaction and happiness as shown in Table 2.1 (for a sample of published articles). On the one hand, some studies in developed countries such as Blanchflower and Oswald (2004) and Alesina et al. (2004) treat life satisfaction and happiness interchangeably. On the other hand, as Deaton (2008) reiterates, 'life satisfaction' and 'happiness' are not synonyms. Life Satisfaction questions ask respondents to make an overall *evaluation*, while happiness captures *affect* or temporary feelings.[5] Stevenson and Wolfers (2008) in a cross-country empirical study find GDP to be more strongly correlated with satisfaction than happiness suggesting the two measures of SWB may not be synonymous as previously noted. They also find several puzzling outliers. For example, they observe that two of the poorest

[5]Literature in psychology divides aspects of well-being as '*cognitive (evaluative)*' and '*affect (emotional)*'. The cognitive aspects are 'evaluative' which compares well-being against targets (benchmarks), and 'affect' which is related to 'positive and negative' feelings. We argue that general life satisfaction questions are likely to elicit the evaluative aspect of well-being, while happiness questions are more likely to reflect the emotional aspect.

countries in their sample, Tanzania and Nigeria, report the highest average happiness levels despite both reporting lower average satisfaction with Tanzania reporting the lowest average satisfaction in their sample.

In this chapter, we study the determinants of SWB in rural Ethiopia with a particular focus on the role of trust, religion, and political institutions. Our primary variables of interest are particularly relevant to the context of developing countries. Due to the absence of strong formal institutions such as media, banking, and a judiciary system, people rely on networks for information, credit, and arbitration. Religion, in addition to fostering networks, helps as a coping mechanism in times of despair. Due to the high level of intervention of local governments in household lives in rural areas from land distribution to food aid distribution in times of crisis, trust in local officials has a direct bearing on the well-being of rural areas. Hence, focusing on institutional variables as determinants of well-being in rural areas provides useful insights for policy. Comparison of the determinants of life satisfaction and happiness measures can highlight the mechanism through which various institutional measures affect welfare of households.[6] In addition, the treatment of these two concepts separately allows us to investigate whether happiness and satisfaction are distinct from one another or synonymous for the case of our Ethiopian sample.

[6] We are not aware of any study that evaluates the two aspects in a developing country context.

Table 2.1: **Comparison of Selected SWB Studies Published in Economics Journals**

Author	Main Outcome Variable	A Measure of formal or informal Institutions	Sample Coverage	Published Journal
Akay and Martinsson (2011)	Ambiguous[a]	-	Ethiopia	Economic Letters
Alesina et al. (2004)	Happiness and Satisfaction Interchangeably	-	Europe and USA	Journal of Public Economics
Asadullah and Chaudhury (2012)	Satisfaction	Religion, Social and Institutional Trust	Bangladesh	Journal of Economic Psychology
Blanchflower and Oswald (2004)	Happiness and Satisfaction	Religiosity (not reported)	UK and USA	Journal of Public Economics
Clark et al. (2008)	Happiness and Satisfaction Interchangeably	-	Cross-country over time	Journal of Economic Literature
Deaton (2008)	Life Satisfaction Life Satisfaction	-	Cross-country over time	Journal of Economic Perspectives
Easterlin (1995)	Happiness and Satisfaction Interchangeably	-	Cross-country over time	Journal of Economic Behavior and Organization
Easterlin (2001)	Happiness and Satisfaction Interchangeably	-	Cross-country over time	The Economic Journal
Ferrer-i Carbonell and Frijters (2004)	Happiness	-	West Germany	The Economic Journal
Frey and Stutzer (2000)	Satisfaction	Political Institutions , and Participation,	Switzerland	The Economic Journal
Frey and Stutzer (2002)	Happiness and Satisfaction Interchangeably	Political freedom Political freedom	Review of Various studies	Journal of Economic Literature
Helliwell (2003)	Satisfaction	Quality of governance, trust, and religion	Cross-country samples	Economic Modelling Economic Modelling
Helliwell (2006)	Satisfaction	Quality of governance, social capital	Cross-country samples	The Economics Journal
Kingdon and Knight (2007)	Satisfaction	-	South Africa	Journal of Economic Behavior and Organization
Knight et al. (2009)	Happiness	-	China	China Economic Review
Litchfield et al. (2012)	Satisfaction	Religion and community organization	Albania	Journal of Economic Behavior and Organization
Oswald (1997)	Happiness and Satisfaction	-	Europe and USA	The Economic Journal
Stevenson and Wolfers (2008)	Happiness and Satisfaction	-	Cross country and over time	Brookings Papers on Economic Activity

[a]Survey questions concern satisfaction, but responses are in terms of happiness.

2.3 Religious and Socio-Political Institutions in Ethiopia

2.3.1 Religion and Religiosity in Ethiopia

According to the Ethiopian Population and Housing Census of 2007, 43.5% of the population belongs to the Ethiopian Orthodox Church (EOC), while 33.9% are Muslim. Protestants account for 18.6% while traditionalists, Catholics and others account for the remainder. There is a clear geographic pattern in the distribution of religion in the country. The EOC followers dominate the north and central highlands while the eastern and southeastern lowlands are predominantly Muslim areas. Protestantism boasts a strong and rising presence in the South while Catholicism is scattered in some pockets in different parts of the country. Traditional religions can be observed in the southern regions of the country.

The Ethiopian people can be regarded as religious. Direct and indirect measures of religiosity computed using the WVS confirm this. Ethiopians spend relatively more time in prayer (religious centres) and exhibit a higher aversion to divorce as shown in Tables A.1 and A.2 in the appendix.[7]

Christianity and Islam have had a long presence in the country. A traditional form of Judaism is also practised by a small minority in some parts of the northwestern region of the country.[8] Christianity became the state religion during the reign of King Ezana of the Axumite Kingdom in the 4th century and continued to be so until 1974. Islam emerged in Ethiopia immediately after its foundation in the 7th century when several disciples of Mohamed, including his relatives, took refuge in the country to escape persecution in

[7] According to the revised family law (2000), Federal Democratic Republic of Ethiopia (2000), property allocation between spouses in the event of divorce shall be made in accordance with an agreement during marriage. Each partner has the right to claim a share of common properties owned or developed after marriage.

[8] In 1991, more than 14,000 Ethiopian Jews were airlifted to Israel under a covert operation, known as 'Operation Solomon' as the civil war in Ethiopia reached its climax, and shortly before then president, Mengistu, was toppled from power (see Spector (2005) for details).

Arabia. Throughout the period, Islam was firmly established primarily in eastern and southeastern parts of the country. Occasional conflicts between Christian and Muslim kingdoms erupted during the medieval period, especially in the 16th century. However, political hegemony, and not religion, was the primary source of the tension in this period (Ephraim, 1971). Historically government machinery was for the most part controlled by Christian Highlanders while Muslims were active in commerce (Ofcansky and Berry, 1991).

In the South, where traditional religions were more common, Christianity and Islam co-existed since the early 20th century. Protestantism and Catholicism became popular from the 1950s due to advantages in education and the potential to gain status among a growing minority of converts (Hamer and Hamer, 1994).

In the period up to 1974, when Christianity was the state religion of the country, the church played an important role in society specially shaping local institutions such as the family, community arbitration, and education. As reviewed by Pankhurst (1992) many 19th century and earlier foreign writers were amused by the multitude of churches, monasteries, and the number of clergy. Some writers estimated that in the 19th century about a quarter of the population in the north and central highlands of present-day Ethiopia comprised clergy (Dufton, 1867) as cited in Pankhurst (1992). The abundance of religious centres and communities is still evident in rural Ethiopia. However, with the expansion of the modern school system allowing parents to send their children to schools, the number of priests and deacons has been on the decline in recent years. On the other hand, more religious freedom has increased religiosity, which is reflected in increased participation in religious activities and teaching in the urban parts of the country.

After the 1974 revolution and the subsequent replacement of the monarchy by a socialist junta, Ethiopia became a secular country with no state religion. Between 1974 and 1991 the Marxist leaning military government suppressed religious activities in various

ways such as confiscating religious properties and abducting and jailing religious leaders. The harassment was directed at all religious denominations, but it was particularly severe for the newly introduced Western religions such as Lutherans and Jehovah Witnesses; as it was easier for the government to accuse them of being linked to imperialism and the CIA (Brown, 1981). After the 1991 change of government, the new market-oriented administration allowed freedom of religion and religious activities. Church and mosque construction began in earnest.

Faith-based charities are common in Ethiopia and are engaged mainly in supporting orphans, older people, and the physically challenged. Moreover, they also engage in the construction of schools, clinics, and drinking water facilities often in remote and vulnerable areas. The charity activities are common to all major religions in the country.[9]

In ethnically diverse societies, religion can have a significant role as a unifying force. Ethiopia is ethnically very diversified with more than 70 different languages spoken. However, more than 96% of the total population follows one of the three major religions (EOC, Islam, and Protestantism), which means that individuals with different ethnic backgrounds are likely to share a religion. Hence, in the Ethiopian context, religion is more of a unifying than a dividing force.

Religious congregations also serve as a crucial platform for information sharing. In rural Ethiopia, even local politicians use religious congregations to announce important administrative decisions. Ethiopians also have a high regard for religious people. In rural Ethiopia, a churchgoer is almost synonymous with a good person. A person that regularly visits a church or a mosque is regarded as trustworthy, disciplined, honest, and responsible. Hence, religious entrepreneurs can benefit from their religiosity in at least two ways: 1) in networking and obtaining information benefits directly from interaction with people in places of worship; 2) by virtue of being known to people as religious, they easily command

[9]For a discussion of the state of non-state actors in Ethiopia, see Cerritelli et al. (2008).

trust from customers, which could foster their access to informal credits and markets for their products (Azzi and Ehrenberg, 1975).

Hence, religion and religiosity have potentially far-reaching implication for well-being in Ethiopia. Studying the role of religion and religiosity in well-being in a religious country can help policy makers to foster the positive aspects of such institutions for the benefit of society.

2.3.2 Social and Political Institutions in Ethiopia

Ethiopia experienced two extreme regime changes in the last four decades: from monarchy to socialism in 1975, and to free market orientation in 1991. The overthrow of Emperor Haileselassie's monarchy occurred through a popular revolution initiated by army discontents and student movements that soon eventuated in a dictatorship by a military junta known as the 'Dergue'. The replacement of the socialist military dictatorship by a more free-market oriented government in 1991 occurred in the wake of an armed guerrilla struggle in many parts of the country, particularly the North.

The current government ratified a new constitution in 1995 which established the current ethnic based federal system comprising nine regional states (Federal Negarit Gazeta, 1995). The regional states are divided into Zones that comprise 'Woredas' (districts). Woredas are then subdivided into 'Kebelles', the lowest government administrative units. Since 2002, the government has been actively engaged in decentralising power to lower administrative units particularly Woredas through its District-Level Decentralisation Program (DLDP) (see Ayenew (2007) for a review of the progress of the DLDP).

Hence, the local political administration is strongly linked to the economic and social life of households in rural Ethiopia. Decisions on who participates in agricultural extension programs (for example, the distribution of fertilisers and other inputs), conflict resolution, and participation in food security schemes such as cash transfer and public work are some

of the responsibilities of the local administration. More power has trickled down to local authorities in recent years as part of the country's decentralisation program. The Woredas have assumed more authority in planning, collecting local taxes, and budgeting. Hence, the degree of confidence and trust in government, particularly in local administration is a potentially important element of well-being for households.

2.4 Data and Descriptive Statistics

2.4.1 Data and Variable Definitions

In this chapter, we use the sixth round of the Ethiopian Rural Household Survey (ERHS). It was undertaken in 2004 by the Department of Economics at Addis Ababa University in collaboration with the International Food Policy Research Institute and the Centre for the Study of African Economies at the University of Oxford. The ERHS had a 7th round conducted in 2009. However, this round does not have complete religion information as the type of religious denomination was not asked. Moreover, only female members of the households provide religiosity information in this round as the question was only directed to them. Hence, unless the household head is a female, the level of religiosity of the head is not known. Earlier rounds (prior 2004) do not have SWB information. Thus, the current study focuses on the 2004 wave. The data are obtained from Hoddinott and Yohannes (2011).

The survey was conducted in 15 villages from 15 Woredas (Districts) scattered across the major agricultural zones of the country in the four major regions, namely Tigray, Amhara, Oromia, and The Southern Nations, Nationalities, and Peoples Region (SNNPR). The survey is not nationally representative as it excludes pastoral and semi-pastoral areas of the country, but can broadly capture farming household behaviour in the country. Overall a total of 1477 households has been covered in at least one of the surveys until

2004.[10] Random sampling was applied within each village, stratified by female-headed and non-female headed households (Dercon and Hoddinott, 2011).

The survey contains household-level demographics and socio - economic characteristics, agriculture and livestock information, consumption[11], and health among others. It also contains detailed information on SWB (life satisfaction and happiness) and informal institutions such as general trust, government trust, participation, and religion.

We use two indicators of the subjective assessment of well-being, namely *'general life satisfaction'* and *'momentary level of happiness'*. In the life satisfaction question, respondents were asked level of agreement with a statement "I am satisfied with my life". Respondents are presented with seven possible responses 'Strongly Disagree','Disagree','Slightly Disagree','Neither Agree or Disagree', 'Slightly Agree', 'Agree', and 'Strongly agree'. The happiness question is framed as "Taken all together, how would you say things are for you these days: would you say you are: 'Not too happy', 'Pretty happy', or 'Very happy'.[12]

The units of analysis are the heads of households as some of our key covariates such as religion, trust, and participation in formal and informal institutions are directed to them. Satisfaction and Happiness questions are asked twice in the survey. We use the responses of the head of households.[13]

Our main covariates of interest are as follows. The logarithm of real consumption per capita and wealth (a buffer against shocks) measured by the logarithm of tropical livestock

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[10] In the 2004 round, 1371 households were interviewed.

[11] Consumption includes all food consumption in the last week comprising from own stock, purchased, and obtained as gifts in adult-equivalent terms; and non-food consumption such as cloths converted into monthly levels. It is then deflated by food price index based on local (roughly Woreda) level 1994 as a base year. Livestock is measured by tropical livestock units (TLU) by associating different weights to poultry, sheep, goats, oxen, camels, etc. based on their values.

[12] In this thesis, 'satisfaction' and 'life satisfaction' are used interchangeably. Likewise, 'happiness' and 'momentary happiness' are treated as synonymous.

[13] The SWB responses by male household heads are provided in the first part of the survey while responses by female household heads are given in part 3 of the survey. The survey has four parts conducted in the course of several days.

units, both of which can be regarded as welfare metrics. We address the role of institutional factors using religion (dummy for Catholic, Muslim, and Protestant where Orthodox Christian is the base), religiosity measured by the number of visits to places of worship in the last month before the interview, general trust, political trust, and participation in political and informal institutions.

We measure the level of general trust from a respondent's level of agreement with the statement "Most people can be trusted".[14] Respondents are asked to express their level of agreement with this statement from one of seven choices ranging from 'strongly disagree' indicating strong distrust to 'strongly agree' for a high level of trust. By the same manner, we measure political (government) trust from a respondent's level of agreement with the statement "I am Confident in local officials ability".

Out of 1371 households surveyed in the 2004 round, our final dataset comprises 1,114. Some households are excluded due to missing information on variables of interest and information on some variables being provided by a member of household other than the head.

The frequency distributions of satisfaction and happiness responses are given in Tables 2.2 and 2.3 respectively. The satisfaction distribution indicates that the two extremes ('strongly disagree' and 'strongly agree') and the median category ('neither agree nor disagree' have a very small proportion of responses. Hence, to avoid potential instability of our model, we conflate the satisfaction responses into three categories. The first category consists of the *'strongly disagree and disagree'*; the second comprising the three middle responses, i.e. *'slightly disagree, neutral, and slightly agree'*; and the third category with *'agree and strongly agree'*. Moreover, such conflation facilitates comparison with the happiness model. Table 2.4 reports the frequency distribution of the conflated satisfaction

[14] In this thesis, 'trust' refers to the level of general trust individuals have in other individuals such as their neighbours or community members. We use 'general trust' and 'trust' interchangeably.

each of its cells with sizable proportions.

Table 2.5 presents a description of the variables and selected summary statistics.

Table 2.2: **Frequency Distribution of Satisfaction Responses**

I am satisfied with my life	Freq.	Percent	Cum.
Strongly disagree	81	7.27	7.27
Disagree	260	23.34	30.61
Slightly disagree	172	15.44	46.05
Neither agree nor disagree	82	7.36	53.41
Slightly agree	257	23.07	76.48
Agree	240	21.54	98.03
Strongly agree	22	1.97	100
Total	1,114	100	

Table 2.3: **Frequency Distribution of Happiness Responses**

Happiness	Freq.	Percent	Cum.
Not too happy	394	35.37	35.37
Pretty happy	586	52.6	87.97
Very happy	134	12.03	100
Total	1,114	100	

Table 2.4: **Frequency Distribution of the Conflated Satisfaction Responses**

satisfaction	Freq.	Percent	Cum.
Dissatisfied	341	30.61	30.61
Neutral	511	45.87	76.48
Satisfied	262	23.52	100
Total	1,114	100	

Table 2.5: **Summary Statistics**

Variable	Description	N	Mean	SD	Min	Max
LIFE SATISFACTION	Life Satisfaction	1114	0.93	0.73	0	2
HAPPINESS	Happiness	1114	0.77	0.65	0	2
LIFE_SATISFACTION_LADDER	Where on the ladder is your standing? 10 best possible life, 0 the worst possible life	1114	4.42	1.81	0	10
LRCONSUMPTION_PC	Logarithm of real per capita consumption	1114	4.17	0.81	0.87	7.01
LLIVESTOCK	Logarithm of Tropical Livestock Units	1114	1.1	0.72	0	3.2
LAND_PC	Per capital farm-land owned in Hectares	1114	0.34	0.47	0	7.24
MARITAL STATUS	Base reference: Married =0					
SINGLE	1 if Single, 0 otherwise	1114	0.02	0.15	0	1
WIDOWED	1 if Widowed, 0 otherwise	1114	0.18	0.38	0	1
DIVORCED	1 if Divorced, 0 otherwise	1114	0.08	0.26	0	1
TRUST	Most people can be trusted: 1(Strongly disagree) - 7(Strongly agree)	1114	4.37	1.71	1	7
POLITICAL_TRUST	I am Confident in the ability of local officials: 1(Strongly disagree) - 7(Strongly agree)	1114	4.19	1.7	1	7
PARTICIPATION	1 if Head of household has official position in local institutions, 0 otherwise	1114	0.25	0.43	0	1
RELIGIOSITY	Church/Mosque visits per month	1114	6.3	7.15	0	45
CATHOLIC[15]	1 if Catholic, 0 otherwise	1114	0.04	0.19	0	1
MUSLIM	1 if Muslim, 0 otherwise	1114	0.23	0.42	0	1
PROTESTANT	1 if protestant, 0 otherwise	1114	0.2	0.4	0	1
CATHOLIC*RELIGIOSITY	Interaction: CATHOLIC and RELIGSTY	1114	0.34	2.07	0	30
MUSLIM*RELIGIOSITY	Interaction: MUSLIM and RELIGSTY	1114	1.68	5.7	0	45
PROTESTANT*RELIGIOSITY	Interaction: PROTSTNT and RELIGSTY	1114	1.35	3.54	0	40
EDUCATION	Reference: No Education=0					
BASIC_EDU	1 if up to four years of formal education and other informal education, 0 otherwise	1114	0.26	0.44	0	1
POST_PRIMARY	1 if 5 and more years of education, 0 otherwise	1114	0.13	0.34	0	1
MISSING_EDU	Missing Education Information =1	1114	0.03	0.17	0	1
FEMALE	1 = Female, 0=Male	1114	0.27	0.44	0	1
HOUSEHOLD SIZE	Number of members of household	1114	5.76	2.52	1	15
YOUNG	1 if less than 40 years of age, 0 otherwise (middle age 40-60 is the base)	1114	0.31	0.46	0	1
OLD	1 if more than 60 years of age, 0 otherwise (middle age 40-60 is the base)	1114	0.31	0.46	0	1
OLD_CHILDREN	Number of children in households aged 7 and 14	1114	1.15	1.02	0	6
YOUNG_CHILDREN	Number of children in household aged 7 and younger	1114	1.24	1.21	0	5
ILLNESS	1 if respondent had an illness within the two weeks prior to interview, 0 otherwise	1114	0.2	0.4	0	1

[15]Catholic includes both followers of Catholicism and other minority religions. Merged due to small number of followers in both categories

2.4.2 Descriptive Statistics

In this section, we briefly examine the potential relationships between measures of SWB and other socioeconomic characteristics briefly.

Mean satisfaction and happiness across social groups based on the status of reported poverty, religion, general trust, government trust, marital status, age and gender are shown in Figures 2.1 and 2.2 respectively. The mean levels of satisfaction and happiness are different across the lower and upper bounds in each category using a 95% confidence level. For example, mean satisfaction among the households that consider themselves poor is significantly lower than that of the non-poor households. Similarly, we observe significant differences among the various groups in the happiness data.

Figure 2.3 shows whether someone is satisfied or dissatisfied with their life when moving along the percentile spectrum of log per capita consumption. Figure 2.4 shows whether someone is happy or unhappy with their life when moving along the percentile spectrum of log per capita consumption. The incidence of being satisfied increases as consumption increases. The same pattern can be detected for happiness. The reverse is true for dissatisfaction and unhappiness. The strength of the role of consumption for well-being slightly declines as consumption increases pointing to the well-known concave relationship between income and well-being found in the literature (for example, Easterlin (1974, 2001)).[16]

Table 2.6 provides Spearman's pairwise correlations of SWB and our main covariates. Life satisfaction is significantly correlated with all the main welfare, religious and institutional variables. Momentary happiness is similarly correlated with the welfare metrics and some of the institutional variables.[17]

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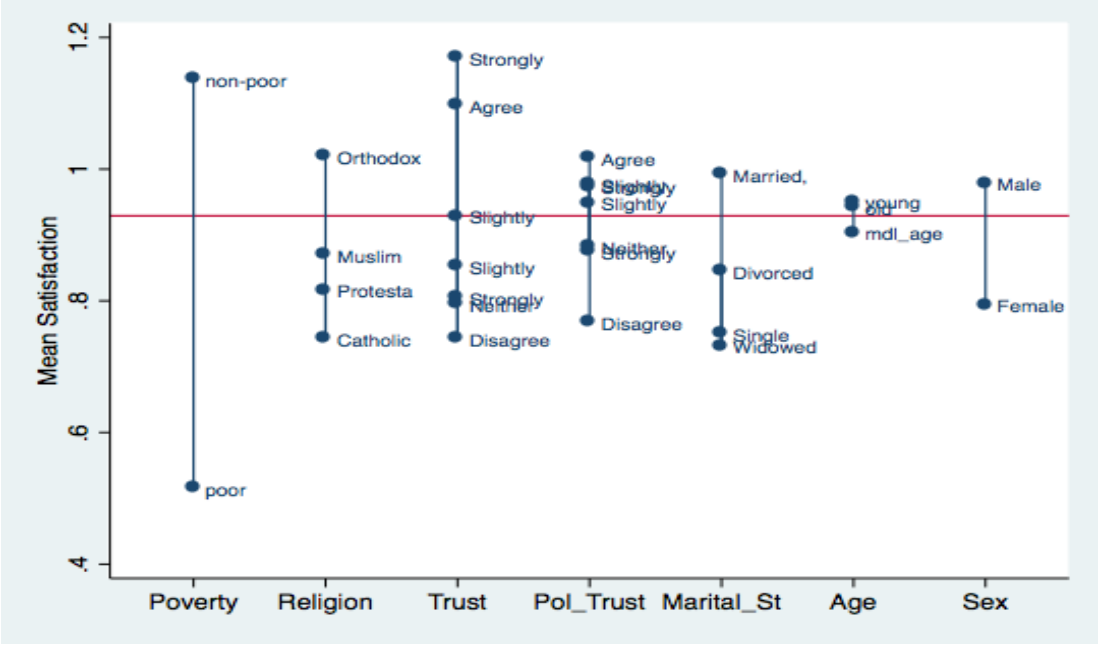
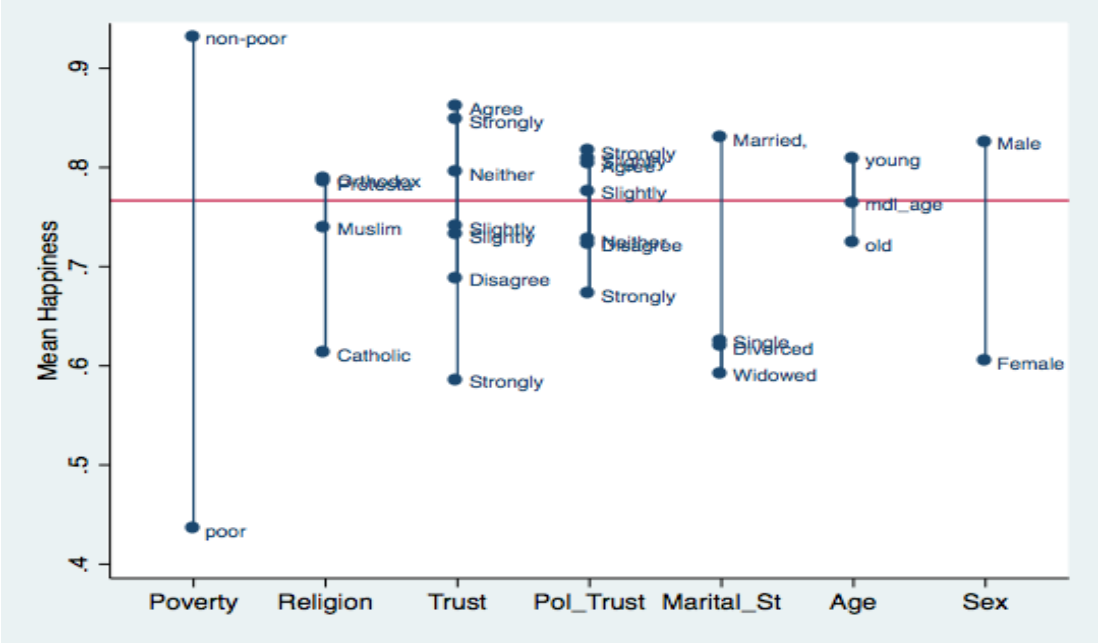
[16]The concave relationship between consumption and SWB in remote poor areas could be due to the absence of markets catering for diverse demand for goods and services in rural areas.

[17]Since satisfaction and happiness are both ordinal, we use Spearman's pairwise correlation coefficient instead of Pearson's pairwise correlation. Using Pearson's correlation coefficient reveals similar results (not reported).



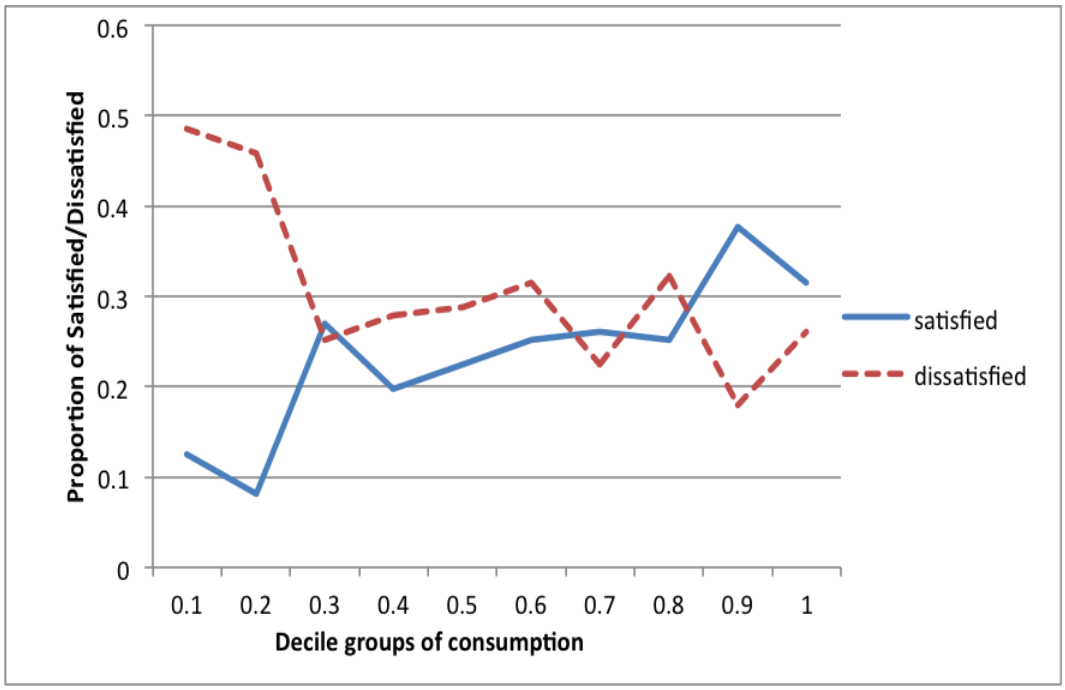
Note: Satisfaction takes values 0, 1, and 2 created by conflation of the 7 scale response. 'Poverty' is obtained from respondents evaluation of their household. Respondents choose any of seven possible categories ('very rich', 'rich', 'comfortable', 'can manage to get by', 'never have quite enough', 'poor', and 'destitute'). We conflated the last three (never have quite enough, poor, and destitute) as representing reported 'Poverty'.
Catholic includes both followers of Catholicism and other minority religions.

Figure 2.1: **Mean Values of Satisfaction Across Socio-Economic Characteristics**



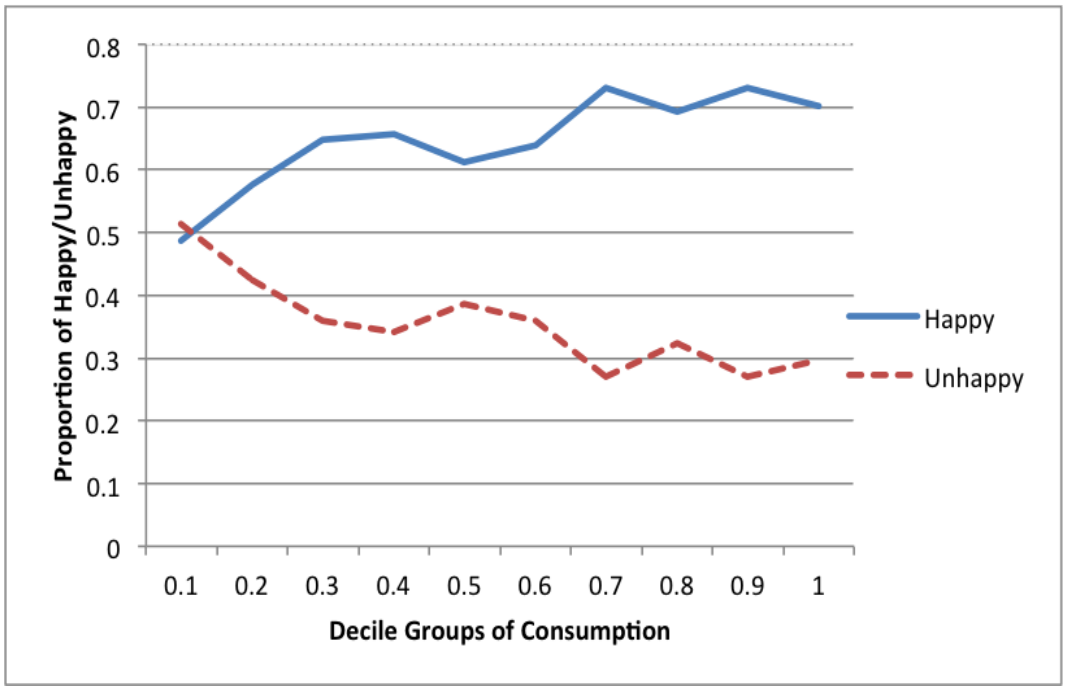
Note: Poverty and the 'Catholic' category as defined in Figure 2.1.

Figure 2.2: **Mean Values of Happiness Across Socio-Economic Characteristics**



Note: Vertical axis (Proportion of satisfied, dissatisfied); Horizontal axis (Decile groups based on real per capita consumption)

Figure 2.3: **Satisfaction and Consumption**



Note: Vertical axis (Proportion of happy, unhappy); Horizontal axis (Decile groups based on real per capita consumption)

Figure 2.4: **Happiness and Consumption**

Table 2.6: **Spearman's Pairwise Correlations: SWB and Main Covariates**

	SATISFACTION	HAPPINESS	LRCONSUMPTION_PC	LLIVSTOCK	RELIGIOSITY	TRUST	POLITICAL TRUST	PARTICIPATION
SATISFACTION	1.00							
HAPPINESS	0.42*** [0.00]	1.00						
LRCONSUMPTION_PC	0.19*** [0.0]	0.15*** [0.00]	1.00					
LLIVSTOCK	0.33*** [0.00]	0.31*** [0.00]	0.27*** [0.00]	1.00				
RELIGIOSITY	0.02 [0.54]	0.02 [0.49]	-0.06 [0.06]	-0.08** [0.01]	1.00			
TRUST	0.19*** [0.00]	0.11*** [0.00]	0.00 [0.92[	0.03 [0.37]	-0.04 [0.24]	1.00		
POLITICAL TRUST	0.10*** [0.00]	0.05 [0.09]	0.03 [0.35]	-0.01 [0.62]	0.01 [0.65]	0.29*** [0.00]	1.00	
PARTICIPATION	0.15*** [0.00]	0.09*** [0.00]	0.07** [0.01]	0.18*** [0.00]	0.05 [0.10]	0.02 [0.55]	0.05* [0.08]	1.00

Note
p-values in brackets

Table 2.7: **Well-being and Religiosity by Religious Denomination**

Religion	Satisfaction	Happiness	Religiosity
Orthodox	1.02 (0.73)	0.79 (0.65)	5.65 (6.25)
Catholic	0.74 (0.70)	0.62 (0.69)	6.13 (6.49)
Muslim	0.87 (0.77)	0.74 (0.65)	7.42 (10.04)
Protestant	0.82 (0.68)	0.78 (0.64)	6.73 (5.15)
Total	0.93 (0.73)	0.77 (0.65)	6.30 (7.15)

Note
Catholic includes both followers of Catholicism and other minority religions
Using a non-parametric version of ANOVA test of equality of Populations, the Kruskal Wallis test, we reject equality of the means of satisfaction and religiosity across the religious denominations. However. The difference in happiness among the religions is not statistically significant at conventional levels.

Table 2.7 depicts well-being and religiosity levels by religious denominations. Followers of the Orthodox religion reported the highest life satisfaction among the denominations. However, the difference in momentary happiness among the major religious denominations is not statistically different at a 10% significance level. Muslims report the highest average religiosity levels, followed by Protestants. Protestant, however, report the least variance in religiosity levels. The lower variance among Protestants can be explained by relatively more organised weekly Sunday services compared to followers of the other denominations (for example, EOC followers are more likely to go to church during the days dedicated to their local saint in addition to Sundays). Hence, the level of religiosity and variability among followers is correlated to the religious denomination.[18] Our measure of religiosity only captures the participation but not the faith aspect religion. The faith element is measured by whether individuals believe in God or not, or the number of times they pray.

District level characteristics are shown in Table A.3 of the appendix. Mean satisfaction and happiness levels differ among the villages.[19]

The correlations are indicative of a potential predictive relationship between the set of our main covariates and SWB. The nature of these relationships will be explored in more detail using econometric analysis.

2.5 Econometric Methodology

Our analysis uses ordered probit methods in common with most of the economic literature on the determinants of SWB. However, this specification of the standard ordered probit

[18]The proportion of zero religiosity (individual not going to religious centres) is our sample is about 15%. Protestant report the least percentage of zero religiosity (4%), followed by Orthodox (14%), Catholics (21%), and Muslims (28%).

[19]Using a non-parametric version of ANOVA test of equality of populations, the Kruskal Wallis test, we reject equality of the means of satisfaction levels across villages (chi-squared = 86.016 with 14 D.F. probability = 0.0001). The test also rejects equality of happiness across villages (chi-squared = 86.002 with 14 D.F. probability = 0.0001). This implies that some village level characteristics may be driving part of the differences in well-being levels both among individuals and across villages.

is based on several assumptions such as normality, homoscedasticity, threshold stability, which in practise may not be satisfied by the data. Hence, we subject our regression models to a battery of tests to check for their adequacy.

2.5.1 Standard Ordered Probit

Previous and current SWB surveys are designed to elicit a respondent's level of agreement to questions such as whether the person is satisfied with life or not, or to rate the level of well-being within a certain range. Since there are no units of cardinal measurements of preference, these responses are ordinal in nature. Hence, only the ordering matters without any quantitative interpretation attached to the specific number or scale used to represent such preferences.[20]

Let y_i^* represent the latent index of an individual's utility level, which is continuous, and can take any value in the range $-\infty < y_i^* < \infty$. We assume the latent utility is related to the observed ordinal satisfaction data as follows:[21]

$$\begin{aligned} y = 0 \quad & [\text{Dissatisfied }] \quad && \text{if } -\infty < y_i^* < \theta_0 \\ y = 1 \quad & [\text{Neutral }] \quad && \text{if } \theta_0 \leq y_i^* < \theta_1 \\ y = 2 \quad & [\text{Satisfied }] \quad && \text{if } \theta_1 \leq y_i^* < \infty \end{aligned}$$

A similar formulation applies for happiness.

The unobserved outcome can be expressed as a function of the respondents characteristics that are assumed to be correlates of the underlying utility (satisfaction or happiness) function. The literature assumes the latent relationship to be linear as follows:

$$y_i^* = x_i'\beta + u_i, \qquad u_i \sim N(0,1) \tag{2.1}$$

[20] This is the more common practise in most economic research on SWB while the psychology literature has, for the most part, assumed cardinality in the SWB response, and hence uses Ordinary Least Squares (OLS) estimation methods (Ferrer-i Carbonell and Frijters, 2004).

[21] As discussed in section 2.4, we conflate the original satisfaction responses into three categories.

With the standard normal assumption of the error term, we can derive the conditional distribution of the SWB responses (y) given the correlates (x) by computing the general formulation:

$$P(y) = \Phi(\theta_j - x^{'}\beta) - \Phi(\theta_{j-1} - x^{'}\beta), \qquad j = 0, 1, 2 \tag{2.2}$$

where $\Phi(.)$ denotes the cumulative distribution function operator for the standard normal.

To ensure the identification of the parameters of the model '*location/reference*' and '*scale*' need to be defined. In this paper, we estimate the model with a '*constant*' term, and to ensure identification of the thresholds we impose ' $\theta_0 = 0$ ' for the first threshold.

The normalisation of the variance of the error term to 1, assumes homoscedasticity. With these assumptions, Equation (2.2) represents a well-behaved probability model amenable to estimation by maximum likelihood methods. The log-likelihood function for the model is formulated as

$$\log L = \sum_{i=1}^{n} \sum_{j=0}^{2} m_{ij} \log[\Phi(\theta_j - x'\beta) - \Phi(\theta_{j-1} - x'\beta)] \tag{2.3}$$

Where $m_{ij} = 1$ if individual i's response falls within the j's category, and 0 otherwise.

2.5.2 Heteroscedastic Ordered Probit

Subjective well-being data, like in many microeconomic applications, may be susceptible to heteroscedastic errors. Income is an example of a possible source of such variance that results in individuals having different extremes in their responses to well-being questions. It is likely that people at higher ends of the consumption spectrum exhibit greater variation in satisfaction from consumption compared to those at the lower end in the spirit of Engle's Law. After a certain level of income (for example, after basic needs are fulfilled), individuals are likely to have more diverse demands and hence likely to exhibit more

divergent responses to specific covariates. Other potential sources of variation in responses given covariates include the level of emotional stability and age in the case of health-related well-being questions (Greene et al., 2014). More emotionally unstable individuals are likely to give more varied responses than emotionally stable ones. Moreover, older individuals are likely to have a more varied assessment of their health than younger individuals, who are more likely to consider themselves healthy. The existence of heteroscedasticity results in biased and inconsistent estimates of the ordered probit model (Litchfield et al., 2012; Greene and Hensher, 2010).

We use diagnostic tests derived by Machin and Stewart (1990) based on general residuals developed by Gourieroux et al. (1987) to test for heteroscedasticity. The details of the derivation of the test adopted from Machin and Stewart (1990) are provided in Appendix A.3.

We account for heteroscedasticity by incorporating a variance function in the ordered probit model.

$$\sigma_i^2 = (e^{\omega_i'\gamma})^2 \tag{2.4}$$

Where ω_i comprises a vector of variables that are the source of the residual variance and γ is a vector of unknown parameters. We modify the standard probability response to incorporate the variance function resulting in a modified form of Equation (2.3). The modified likelihood function now becomes [with standardised mean functions (β), and thresholds (θ's)].

$$\log L_{Hetero} = \sum_{i=1}^{n}\sum_{j=0}^{2} m_{ij} \log[\Phi(\frac{\theta_j - x'\beta}{e^{\omega_i'\gamma}}) - \Phi(\frac{\theta_{j-1} - x'\beta}{e^{\omega_i'\gamma}})] \tag{2.5}$$

Since there are no strong theoretical foundations as to how the sources of variance can be modelled, we follow Lemp et al. (2011), Ritter and Vance (2011), and Litchfield et al.

(2012) in modelling all of the covariates in the variance component using the modified likelihood function (2.5) and conduct tests to determine the significant variables to be included in the variance function (2.4). Our analysis reveals that logarithm of per capita consumption and location (district dummies) to be the significant sources of variation for the satisfaction model. For the happiness model, we find logarithm of livestock-holding and location to be the sources of heteroscedastic errors.

2.6 Results and Discussion

2.6.1 Overall Results

Table 2.8 reports Standard and Heteroscedastic Ordered Probit regressions for satisfaction and happiness without including religion-religiosity interaction terms. In comport with the literature on the subject, own and relative consumption per capita, livestock ownership, general trust, government trust, participation in formal and informal institutions, and religiosity all positively predict life satisfaction. Own consumption per capita,Omitted livestock ownership, and general trust positively correlate with momentary happiness.

However, as discussed in section 2.4 religiosity levels are correlated with religious denominations. Moreover, since some of the denominations, typically Catholicism and Protestantism, are relatively new to the country and a minority, the implication of religiosity on well-being can depend on the type of religion. Hence, the inclusion of 'religion-religiosity' interactions terms is essential.[22]

Regression results of the standard ordered probit models are reported in Table 2.9. As shown in the table, the null hypothesis of homoscedasticity is rejected for both the life satisfaction happiness models at conventional significance level. Hence, we incorporate a variance function based on the logarithm of real consumption per capita, and the district

[22]Omitted variables tests (not reported) of the interactions of religion and religiosity with general trust indicate that omitting those variables is empirically justified.

controls for the satisfaction model. Similarly, a variance function based on the logarithm of livestock holding and the district controls is adopted to address the heteroscedasticity for the happiness model. Hence, our main analysis relies on the heteroscedastic model.

The variance functions based on the log of consumption per capita and the log of livestock holdings are significant at conventional levels for the satisfaction and happiness models respectively. Likewise, district dummies are also significant in both models. As expected households at the high-end of consumption per capita report higher variability of responses in satisfaction to changes in the covariates as indicated by a significant positive coefficient in the variance function. In the happiness model, the log of livestock holding has been found to be the significant source of variation. The significant negative coefficient of log livestock in the variance function means that livestock-rich households exhibit a less varied response to happiness than their poorer counterparts. This might be taken to reflect the importance of livestock as an insulator against shocks for livestock-rich households (see, for example, Rosenzweig and Wolpin (1993) for the role of bullocks for consumption smoothing in India, and Gilligan and Hoddinott (2007) in Ethiopia).[23] However, it is puzzling that this variance effect is not detected in the satisfaction equation itself. The more standard variables such as 'illness' and 'age' that are expected to be sources of variances in health-related well-being as suggested by (Greene et al., 2014), do not yield significant variance effects in our models.

[23] Gilligan and Hoddinott (2007) finds that 40% of households in the ERHS data sold livestock to smooth consumption during the 2002 drought.

Table 2.8: **Determinants of SWB: Ordered Probit Estimates Without Interaction Terms**

	STANDARED ORDERED PROBIT				**HETEROSCEDASTIC ORDERED PROBIT**			
	Satisfaction		**Happiness**		**Satisfaction**		**Happiness**	
	Coef.	St.Er.	Coef.	St.Er.	Coef.	St.Er.	Coef.	St.Er.
Constant	-1.66***	0.36	-0.92**	0.36	-2.09***	0.75	-0.62**	0.26
Welfare Metrics								
LRCONSUMPTION_PC	.25***	0.06	.16**	0.06	0.36***	0.12	0.11**	0.04
LLIVESTOCK	.51***	0.07	.48***	0.07	0.60***	0.19	0.36***	0.07
Institutions								
TRUST	.11***	0.02	.05**	0.02	0.11***	0.04	0.03**	0.02
POLITICAL_TRUST	.07***	0.02	0.04	0.02	0.08**	0.04	0.02	0.02
PARTICIPATION	.21**	0.09	0.01	0.09	0.27**	0.13	0.02	0.06
Religion and Religiosity								
RELIGIOSITY	.014***	0.005	0.01	0.01	0.015*	0.008	0.005	0.003
CATHOLIC	-0.16	0.18	0.16	0.19	-0.06	0.21	0.11	0.10
MUSLIM	-0.21	0.15	-0.10	0.15	-0.25	0.20	-0.09	0.11
PROTESTANT	0.09	0.16	0.22	0.15	0.17	0.18	0.15	0.10
Others								
VILLAGE CONTROLS	Yes		Yes		Yes		Yes	
CONTROLS	Yes		Yes		Yes		Yes	
Mu (1)	1.48***	0.06	1.81***	0.06	1.82**	0.52	1.16***	0.20
OBSERVATIONS	1114		1114		1114		1114	
Variance Function								
LRCONSP					0.11**	0.06		
LLIVESTOCK							-0.19***	0.06
VILLAGE CONTROLS					Yes		Yes	

Note
Control variables not reported include land holding size, education, illness, gender, age, and number of younger and older children.
Mu (1) refers to the first cut-off/threshold
***, **, * denotes statistical significance at the 0.01, 0.05 and 0.10 level, respectively using two-tailed tests.

Table 2.9: **Determinants of Subjective Well-being: Standard Ordered Probit**

DEP.VAR.	**SATISFACTION**		**HAPPINESS**	
	Coef.	St.Er.	Coef.	St.Er.
CONSTANT	-1.5***	0.36	-0.86***	0.37
Welfare Metrics				
LRCONSUMPTION_PC	.24***	0.06	.17**	0.06
LLIVESTOCK	.51***	0.07	.48***	0.07
Institutions				
TRUST	.11***	0.02	.05**	0.02
POLITICAL_TRUST	.07***	0.02	0.04	0.02
PARTICIPATION	.21**	0.09	0.01	0.09
Religion and Religiosity				
RELIGIOSITY	-0.001	0.01	0.003	0.01
CATHOLIC	-0.12	0.24	0.3	0.24
MUSLIM	-.33**	0.16	-0.13	0.17
PROTESTANT	-0.13	0.19	0.02	0.2
CATHOLIC*RELIGIOSITY	-0.02	0.03	-0.02	0.03
MUSLIM*RELIGIOSITY	.02*	0.01	0.002	0.01
PROTESTANT*RELIGIOSITY	.04**	0.02	.03*	0.02
Others				
VILLAGE CONTROLS	Yes	-	Yes	-
CONTROLS	Yes	-	Yes	-
Mu (1)	1.48*	0.06	1.81*	0.06
Diagnostics [P-Values in Parenthesis]				
OBSERVATIONS	1114		1114	
LOG-LIKELIHOOD VALUE	-1017.59		-930.5	
HETEROSCEDASTICITY	82.5*** (0.00)		75.3*** (0.00)	

Note
Control variables not reported include land holding size, education, illness, gender, Household Size age, and number of younger and older children.
Mu (1) refers to the first cut-off/threshold
***, **, * denotes statistical significance at the 0.01, 0.05 and 0.10 level, respectively using two-tailed tests.

Table 2.10: **Determinants of Subjective Well-being: Heteroscedastic Ordered Probit**

DEP.VAR.	**SATISFACTION**		**HAPPINESS**	
	Coef.	St.Er.	Coef.	St.Er.
CONSTANT	-1.83***	0.68	-0.55**	0.26
Welfare Metricss				
LRCONSUMPTION_PC	0.34***	0.11	0.11**	0.04
LLIVESTOCK	0.57***	0.18	0.36***	0.07
Institutions				
TRUST	0.11***	0.04	0.03*	0.02
POLITICAL_TRUST	0.08**	0.04	0.02	0.02
PARTICIPATION	0.26**	0.13	0.02	0.06
Religion and Religiosity				
RELIGIOSITY	-0.004	0.01	0.001	0.01
CATHOLIC	-0.09	0.25	0.22	0.14
MUSLIM	-0.40*	0.22	-0.13	0.12
PROTESTANT	-0.07	0.2	0.05	0.12
CATHOLIC*RELIGIOSITY	0.01	0.03	-0.02	0.02
MUSLIM*RELIGIOSITY	0.03*	0.02	0.004	0.01
PROTESTANT*RELIGIOSITY	0.04**	0.02	0.02	0.01
Others				
VILLAGE CONTROLS	Yes	-	Yes	-
CONTROLS	Yes	-	Yes	-
Mu (1)	1.75***	0.5	1.17***	0.2
Variance Function				
LRCONSUMPTION_PC	0.10*	0.06		
LLIVESTOCK	-	-	-0.18*	0.06
VILLAGE CONTROLS	Yes	-	Yes	-
Diagnostics [P-Values in Parenthesis]				
OBSERVATIONS	1114		1114	
LOG-LIKELIHOOD VALUE	-998.3		-913.7	
PSEUDO R-Sq.	0.15		0.15	

Note
Control variables not reported include land holding size, education, illness, gender, age, and number of younger and older children.
Mu (1) refers to the first cut-off/threshold
***, **, * denotes statistical significance at the 0.01, 0.05 and 0.10 level, respectively using two-tailed tests.

Table 2.8 reveals that religiosity positively predicts satisfaction in both the standard and heteroscedastic regressions without religion-religiosity interactions. However, the level of religiosity is related to the religious denomination in our data as shown in Table 2.7. A possible explanation for religious denomination affecting religiosity levels is that some of the religions are relatively new and small in size, and hence are more active in expanding their faiths and tend to have more active followers. This is especially true of Protestants and Catholics.

Therefore, we focus on the ordered probit estimates that involve religion-religiosity interactions. Tables 2.9 and 2.10 report estimates with religion-religiosity interactions. Following the results of the heteroscedasticity tests, our analysis focuses on the Heteroscedastic model reported in Table 2.10. The results are qualitatively comparable to that of the standard model, but the coefficients and the standard errors are larger in absolute terms.

The results are generally in comport with the findings reported in previous studies with some interesting differences. Economic status and social-institutional factors such as religiosity, trust, quality of local governance, marital status, and participation in local institutions significantly affect well-being. The results indicate that happiness tends to reflect welfare metrics and more recent events such as a current illness, while responses to general satisfaction questions indicate respondents' evaluations of their overall status of well-being taking into consideration broader socio-economic characteristics. Happiness has fewer significant predictors compared to life satisfaction. This could be because happiness is momentary, thus more fickle.[24]

[24]Some covariates such as marital status, education, illness, gender are not reported in our main regression tables.

2.6.2 Main Results

Consumption per capita and livestock holding emerge as strong predictors of both life satisfaction and happiness. An analysis of the marginal effects from the Heteroscedastic model reported in Table 2.11 reveals each additional consumption (in logarithmic form) makes an average individual nine percentage points less likely to report 'dissatisfied' and eight percentage points more likely to report 'satisfied. This implies that a 5% increase in consumption decreases the probability of reporting 'dissatisfied' by 0.45 of a percentage point, and increase the probability of reporting 'satisfied' by 0.4 of a percentage point.The positive role of these welfare metrics is evident in all specifications.

In addition to own income, relative income (relative consumption) compared to neighbours or peers can potentially affect SWB. However, due to lack appropriate information on neighbours or smaller geographic unit, we have not included a measure of relative income in our main models. Most studies in developing countries have reported little or no effect of relative income on SWB. For example, Ravallion and Lokshin (2010) find little support for positional concern (measured by relative deprivation) for most poor households in Malawi with the exception of the relatively well-off. Similarly, Using surveys of two separate villages in Northern Ethiopia Akay and Martinsson (2011) and Akay et al. (2012) studied the role of '*positional concern*' using experimental methods and find no evidence for the existence of positional concern as defined by the income of others in the community. One potential measure of relative income could be per capita consumption quartiles by village and include an indicator of which quartiles an individual belongs to. Regression results of our satisfaction and happiness models with this measure are provided in Table A.4 in the appendix. The overall results remain robust to the inclusion of the quartiles of consumption. For the life satisfaction model, the fourth quartile report surprisingly lower satisfaction than the first which could reflect the concave nature of the role of income (consumption) on satisfaction rather than an indication of the role of relative

income. The other quartiles do not report a significant difference in satisfaction relative to the first one. There are no significance differences in happiness among the difference quartiles. However, since we also have a measure of consumption and village fixed effects, we can not identify the role of relative income (consumption) in this context. Hence, the results could only be taken as only indicative.

Table 2.11: **Marginal Effects of Selected Variables**

MARGINAL EFFECTS						
	LIFE SATISFACTION			HAPPINESS		
	0	1	2	0	1	2
LRCONSUMPTION_PC	-0.09	0.01	0.08	-0.06	0.04	0.02
LLIVESTOCK	-0.16	0.03	0.13	-0.21	0.12	0.08
RELIGIOSITY	0.001	-0.0002	-0.0009	-0.0005	0.003	0.0004
CATHOLIC*RELIGIOSITY	-0.003	0.0004	0.002	0.01	-0.005	-0.004
MUSLIM*RELIGIOSITY	-0.008	0.001	0.007	-0.003	0.002	0.001
PROTESTANT*RELIGIOSITY	-0.01	0.002	0.01	-0.01	0.007	0.004
TRUST	-0.03	0.005	0.03	-0.02	0.01	0.01
POLITICAL TRUST	-0.03	0.003	0.02	-0.01	0.01	0.004
PARTICIPATION	-0.07	0.01	0.06	-0.012	0.007	0.005

Note
The Marginal Effects are based the the Heteroscedastic Ordered Probit estimates reported in Table 2.10

The results reveal that religiosity has a differential impact on SWB based on religious denomination. Muslims report significantly lower satisfaction levels than Orthodox Christians. Catholics and Protestants also exhibit lower satisfaction levels albeit the difference is not statistically different at a conventional level of significance. On the other hand, religious Muslims and Protestants report significantly higher satisfaction levels than Orthodox Christians revealing a differentiated role for religiosity on well-being. Muslims and Protestants report significantly higher religiosity levels than their Orthodox counterparts in the survey. The marginal effects reported in Table 2.11 reveal that being a religious Muslim makes an individual 0.8 percentage points less likely to report dissatisfied and 0.7 percentage points more likely to report satisfied. Similarly, being a religious protestant makes an individual one percentage points less likely to report being dissatisfied and one

percentage points more likely to report being satisfied. The positive role of religiosity in newly introduced religions in Ethiopia such as Protestantism can be indicative that religion can create a platform for the development of social capital for minority groups. Azzi and Ehrenberg (1975) find a similar result for racial minorities for the US.

Unlike with the general life satisfaction model, religion and religiosity do not feature as significant determinants in the happiness model. This is indicative of a subtle characteristic, often overlooked in well-being studies, which is that respondents can differentiate between general satisfaction and momentary happiness. This is especially so in religious communities that consider future gains from religion (such as going to heaven) in their general satisfaction function but not so in happiness function as it tends to be temporary in nature. For example, a religious person who fasts and avoids feasts may report low responses for momentary happiness, but higher in the overall response to life satisfaction. Moreover, in the event of adverse circumstances, while temporary happiness can drop for religious and non-religious people alike, the overall satisfaction of religious people may not drop significantly as they are likely to attribute the bad events to the will of God (see for example Pollner (1989), Ellison (1991), Frey and Stutzer (2002), Inglehart and Norris (2004) regarding the soothing role of religion in times adversary)).

As in many studies in developing and developed economies general trust among the people and trust in local political officials emerge as strong correlates of satisfaction and happiness in our data. In developing countries, people are dependent on each other and their community in everyday life. Labour sharing in farming and sharing of costs during important social events such as weddings and mourning are hallmarks of life in rural areas. Hence, social capital in the form of trust is an important element. Moreover, in those regions where formal political and administrative institutions are not fully developed, informal institutions based on trust play an important role in society by creating peace and stability in the community and the management of communal resources. A measure of

general trust emerges as a robust determinant of SWB in our satisfaction model as reflected in its large magnitude of 0.11 of a standard deviation and its statistical significance at the 1% level. The marginal effects from the Heteroscedastic model reported in Table 2.11 reveal each additional level of trust makes an average individual three percentage points less likely to report 'dissatisfied' and three percentage points more likely to report 'satisfied'. Other studies that find as strong a direct effect of trust on SWB include Bjørnskov (2003) for more affluent countries, Helliwell (2003) for individual-level data across many countries controlling for national trust levels; Helliwell and Putnam (1995) using cross-country and national surveys for US and Canada; and Asadullah and Chaudhury (2012) in rural Bangladesh.

Confidence in political institutions (government trust) is a statistically robust predictor of SWB. The role of political trust on life satisfaction is not statistically different from that of the effect of general trust.[25] However, while the general trust positively affects both life satisfaction and happiness, confidence in local political institutions affects life satisfaction, but not happiness. The role of local political institutions in rural households is paramount. In the context of rural Ethiopia, the role of local administrative units includes land and agricultural input allocation, arbitration during conflict, food aid distribution, and safety net participation. Hence, the confidence that households have in such institutions that play a significant role in their lives affects them directly through a sense of security and indirectly through effects on resource allocation. Studies that find a positive role of quality of governance and political freedom on SWB include Helliwell (2006) and Diener and Diener (2009), both using cross-country data. On the other hand, Veenhoven (2000) finds that a stronger role of political freedom on SWB in richer countries, while economic freedom has a stronger effect in poorer countries. Our finding implies that effective and

[25]The Wald test indicates that we can not reject the null hypothesis that the difference between the effects of general and political trust on life satisfaction is zero.

transparent political institutions at a local level are highly beneficial for household self-reported satisfaction.

It is interesting to note that general trust significantly predicts life satisfaction and momentary happiness while political trust affects life satisfaction but not momentary happiness. This is a sensible result as an individual's trust in political institutions affects their overall welfare but has little significance in momentary emotions. On the other hand general trust that is crucial in the day to day interactions with people surrounding the individual is important for both an overall well-being and a momentary happiness.

Participation in local institutions in the form of having an official position in community organisations, local administrative committees, or religious institutions, is positively associated with life satisfaction while not so with happiness.[26] This implies that such positions can be fulfilling regarding the overall objective and purpose of life and the sense of contribution to society. However, shouldering the responsibility and ensuring the smooth operation of institutions in poor areas may involve stress and also use up time which otherwise would have been spent on family or other domestic activities.[27] This implies that participatory political and socio-economic institutions can boost well-being. Using survey data from Switzerland, Frey and Stutzer (2000) find people in regions with more developed institutions of direct democracy report significantly higher levels of self-reported well-being.

Similarly, the distinctive effective of religiosity on life satisfaction and happiness is another interesting finding. In line with Azzi and Ehrenberg (1975) individuals take the after-life utility into account when evaluating their overall well-being as reflected in religiosity being a predictor of life satisfaction but not of momentary happiness.

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[26]Such positions are usually voluntary and hence not paid.

[27]The marginal effects from the Heteroscedastic model reported in Table 2.11 reveal that participation decreases the probability of reporting 'dissatisfied' by seven percentage and increases the probability of reporting 'satisfied' by six percentage points.

Table 2.12: **Trade-offs between Selected Covariates: Slopes of Indifference Curves**

Slope for a given Satisfaction level	Standard Order Probit	Heteroscedastic Order Probit
Change in per capita consumption required to compensate for extra day in church/mosque	-0.056** (0.03)	-0.04** (0.02)
Change in livestock holdings required to compensate for extra day in church/mosque	-0.027** (0.01)	-0.025** (0.01)
Change in per capita consumption required to compensate for an extra trust level	-0.43*** (0.13)	-0.32*** (0.1)
Change in per capita consumption required to compensate for an extra government trust level	-0.29*** (0.11)	-0.23*** (0.09)

Note
Based on Table 2.8 for a more straightforward treatment of religiosity as we don't include interactions
Standard Errors are calculated by the Delta Method
***, **, * denotes statistical significance at the 0.01, 0.05 and 0.10 level, respectively using two-tailed tests;

In summary, the differential impact of institutions on life satisfaction and momentary happiness is in comport with Deaton's (2008) and Stevenson and Wolfers's (2008) proposition that life satisfaction and happiness are not synonymous.

To get a sense of the relative importance of the determinants of SWB, we can construct '*indifference curves*' between any two continuous covariates whose slopes represent the '*marginal rate of substitution*' between them. The indifference curves represent various combinations of two covariates that yield the same level of satisfaction. In the current application, the slopes of the indifference curves are given by the minus of the ratio of their β-coefficients (see, for example, Stewart et al. (2004) and Litchfield et al. (2012)). Table 2.12 reports indifference curves for an average individual for selected covariates based on the estimates of Table 2.8.

Focusing on the heteroscedastic models, the slopes of the indifference curves reveal that individuals are willing to sacrifice a 5% of consumption for an additional visit to a church/mosque to stay at the same level of satisfaction. This implies that the value of a visit to a church/mosque is equivalent to 5% of their per capita consumption. Similarly,

one extra visit to a church/mosque per month offsets the loss in satisfaction due to a reduction of 2.6% of livestock holdings. A one point increase, which is large relative to the mean, in general trust or government trust, can compensate for 32% and 23% reduction in consumption per capita respectively. With a mean of 4.37, a one-point increase in general trust corresponds to 23% in percentage terms. Similarly, with an average of 4.19, a one-point increase in government trust corresponds to 24% in percentage terms. Therefore, a 23% increase in general trust compensates a reduction in consumption of 32%. Moreover, a 24% increase in government trust compensates for a decrease in consumption of 23%.[28] The sizes of the effects of trust (general and government) are surprisingly large. It can be due to the absence of formal institutions in rural areas. Since we have not adequately controlled for potential endogeneity of these factors, the results should be taken only as indicative.

2.6.3 Robustness, Alternative Measures and Estimation

To test the robustness of the coefficients of our main variables of interest to the inclusion of controls, we run ordered probit regression for general life satisfaction with and without various control variables. As shown in Table A.5 in the appendix, our main variables of interest are robust to the inclusion of controls.

To check whether conflation of our main measure of life satisfaction results in difference estimates, we run an ordered probit estimation using the seven scale category. Column 1 of Table 2.13 reports the result of this exercise. The result is broadly similar to the one with conflated satisfaction measure. Column 2 provides OLS estimates of an 11-rung satisfaction question (satisfaction ladder) where respondents were asked to put themselves in a satisfaction ladder from '0' to '10' where '0' is the worst and '10' the best possible satisfaction level. Similarly, the OLS estimates are comparable to that of our main results

[28] A t-test shows that the increase required either in general trust or government trust to offset a reduction in consumption are not statistically different at conventional levels.

based on ordered probit methods. For example, the OLS estimates reveal that, *ceteris paribus*, that a 10% increase in consumption per capita is associated with 0.029 points increase in the satisfaction. Moreover, a one point increase in the general trust and government trust is related to a 0.12 and 0.05 increase in satisfaction responses respectively. With mean values of 4.42 for the satisfaction ladder, and 4.37 and 4.19 for the general trust and political trust , respectively, the impacts of such institutions on satisfaction are not trivial. The broadly similar result for the different specifications and measures of well-being is indicative of the robustness of our models.

Table 2.13: **Alternative Definitions and Estimation: Ordered Probit and OLS**

Dep. Var.	**7-Category satisfaction (not conflated)**	**11- Category Satisfaction**
	Ordered Probit	OLS
	Welfare Metrics	
LRCONSUMPTION_PC	0.18***	0.29***
LLIVESTOCK	0.49***	0.90***
	Institutions	
TRUST	0.10***	0.12***
POLITICAL_TRUST	0.06***	0.05*
PARTICIPATION	0.23***	0.01
	Religion and Religiosity	
RELIGIOSITY	0.0003	-0.01
CATHOLIC	-0.42	0.23
MUSLIM	-0.27	-0.21
PROTESTANT	0.07	-0.08
OTHER_RELIGION	-0.07	0.23
CATHOLIC*RELIGIOSITY	-0.00	-0.05
MUSLIM*RELIGIOSITY	0.02*	0.03*
PROTESTANT*RELIGIOSITY	0.04**	0.04*
RELOTHER	0.06*	-0.05
CONSTANT		-0.27
	Others	
VILLAGE CONTROLS	Yes	Yes
CONTROLS	Yes	Yes
Mu(1)	0.98	
Mu(2)	2.10***	
Mu(3)	2.60***	
Mu(4)	2.83***	
Mu(5)	3.61***	
Mu(6)	5.19***	
N	1114	1114
R-Sq.		0.321
PSEUDO R-Sq.	0.096	

Note
***, **, * denotes statistical significance at the 0.01, 0.05 and 0.10 level, respectively using two-tailed tests;
Mu(i) refers to the 'i's' cut-off/threshold

2.7 Conclusions and Recommendations

Using rich survey data from rural Ethiopia this chapter has studied the determinants of subjective well-being using a heteroscedastic ordered probit model with particular emphasis on the role religious, social, and political institutions. While our results are generally in comport with the literature, there are some differences that reflect the specificity of rural areas in developing countries.

Trust in the general public and trust in local political officials emerge as strong correlates of satisfaction and happiness. This signifies the importance of trust in areas where formal institutions are not developed. The recent devolution of power to lower administration levels in Ethiopia means well functioning political institutions are important for household well-being. On a related issue, participation in formal and informal institutions emerges as a strong predictor of life satisfaction implying participatory democratic institutions even in rural areas play a crucial role in determining well-being.

Religiosity has a differential impact on well-being based on the religious denominations. Religious Muslims and Protestants report higher satisfaction levels than Orthodox Christians. However, religiosity has no statistically significant impact on momentary happiness. The positive role of religiosity on general life satisfaction but not on momentary happiness could indicate religious individuals incorporate after-life-gains such as going to heaven, in their utility function.

The level of consumption, which can capture income levels, is positively related to both general life satisfaction and happiness. The relationship is concave. Given that most of the districts in the sample are drawn from poor, vulnerable areas, it is not conceivable to think the concave relationship stems from richer households being able to meet basic material needs. A more plausible explanation is well functioning markets catering for diverse demands are weak or non-existent, and hence additional income not being translated into immediate utility.

From a methodological point of view, the results indicate happiness responses tend to reflect welfare metrics; while responses to general satisfaction questions indicate that respondents evaluate their overall status of well-being taking into consideration broader socio-economic and institutional characteristics. Hence, happiness and general life satisfaction data convey related, yet distinctive information. The differential impact of institutions on life satisfaction and momentary happiness is in comport with Deaton's (2008) and Stevenson and Wolfers's (2008) proposition that life satisfaction and happiness are not synonymous.

Chapter 3

Tall Paper Walls: The Political Economy of Visas and Cross-border Travel

3.1 Introduction

People have always travelled across villages, towns, districts, and regions on a temporary or permanent basis to varying degrees. After the birth of nation states, people crossed borders for many reasons (see, for example, Nayyar (2002) for a brief history of labour migration). They travelled for potential economic gains, safety reasons (such as fleeing persecution or the outbreak of diseases), business, tourism, and personal purposes. Some movements were random and on a small scale, while others, such as the Jewish exodus, were in large numbers.

In this study, we investigate the determinants of the temporary cross-border flow of people. We focus on short-term outbound travel, as defined by the United Nations World Tourism Organization (UNWTO), where travellers stay from one night up to (but not more than) one year in destinations other than their permanent country of residence. This bilateral data constitute travel for business and leisure (personal and tourism) purposes.

Travel and tourism is one of the fastest growing sectors in many economies. In 2013,

the direct share of travel and tourism in world GDP was about 3%. In the same year, including the indirect benefits (wider effects from investment and supply chains) the share of travel and tourism expenditure to GDP was 9.5%. Similarly, in the same year, it contributed 3.4% of employment directly, and 8.5% of employment when indirect sectors are also included (WTTC, 2014).[1]

In addition to its contribution to GDP and employment, cross-border travel boosts knowledge exchange and technology transfer (see, for example, Andersen and Dalgaard (2011) for the role of cross-border travel on aggregate productivity). It can also generate trade, FDI, and associated benefits. Hence, studying the determinants of cross-border travel can help identify the appropriate policy tools to enhance it. The determinants of cross-border travel have been vastly studied in the context of tourism demand focusing mainly on economic factors such as currency exchange rates and income. However, research on the role of policy interventions such as visas remains thin.

Despite a visa being the main tool for allowing or inhibiting access to foreign borders, its effect on the flow of people has rarely been studied. Lack of readily available data has often been cited as one of the main reasons for a lack of research on visa policies. Neumayer (2010) finds visa restrictions reduce cross-border travel significantly with substantial regional variation. By restricting personal contact across borders, visas hamper trade and FDI flows (Neumayer, 2011). Li and Song (2013) find that a restrictive visa policy was a major factor in the 2008 Beijing Olympics resulting in substantial economic and welfare losses for China.

This essay mainly aims to contribute to the research on visa policies and their impact on cross-border travel. It is based on a gravity model of a cross-section of countries for 2005 and 2010. Visa policies are persistent and slow-changing; hence, the change in such

[1]For detailed data on the contribution of the travel and tourism sector, see the World Travel and Tourism Council website http://www.wttc.org/datagateway.

policies between 2005 and 2010 is small. Moreover, most of the covariates are geography based, and hence do not vary with time. For these reasons, we conduct a cross-sectional analysis for 2005 and 2010 separately instead of panel analysis.

A potential source of endogeneity is that unobserved factors could affect both travel and visas simultaneously. We use Instrumental Variable (IV) methods to address this problem. In particular, we use the United Nations General Assembly Voting Affinity Scores - a measure of how similar or different countries vote, as instruments for visa policies. To tackle the challenge posed by the existence of many zeros in the travel data in estimation, we use the Heckman Two-Step procedure to account for truncation.

We find that imposing a visa restriction results in an 80% and 73% reduction in cross-border travel in 2005 and 2010 respectively. We find similar results using alternative Poisson and Zero-Inflated Poisson models. Our analysis reveals that 22% of bilateral visa policies can be predicted by the quality of the bilateral relationship between countries as measured by the voting affinity scores in the UN General Assembly.

Using aggregate country-level data, we also find an adverse impact of restrictive visa policies on travel and tourism-related revenues and employment. On average a 10 percentage point increase in visa restrictions induces a 11% and 8.6% decreases in travel and tourism-related expenditures and employment respectively.

The rest of the chapter is organised as follows. Section 3.2 presents a review of the related literature. Section 3.3 provides a description of the data used and summary statistics. Section 3.4 presents the econometric methodology and specifies the empirical model, and is followed by section 3.5 containing results and a discussion of the main models. Section 3.6 provides a brief analysis of the impact of visa policies on travel and tourism related expenditure and employment. Section 3.7 concludes.[2]

[2]The statistical software used to estimate the models in this chapter is Stata 13 (StataCorp, 2013).

3.2 Literature Review

Research on the determinants of the temporary cross-border flows of people has taken two main strands (Eilat and Einav, 2004). One strand considers travel as a form of trade in services and applies gravity models. As pointed out in Eilat and Einav (2004), despite trade in services comprising up to 20% of all trade, research on this topic is limited. Kimura and Lee (2006) find that gravity models fit trade in services better than trade in goods. Several studies have separately studied tourism (as opposed to other components of trade in services) in the context of trade-gravity models. Early studies of this kind include Malamud (1973), Durden and Silberman (1975), and Kliman (1981). Due to the lack of a strong theoretical background for the gravity models, interest in travel research using such models declined throughout the 1980s and 1990s.

After Anderson and Van Wincoop (2001) developed a theoretical foundation for the gravity models of trade, however, there has been a re-emergence of gravity models in travel research. Morley et al. (2014) developed a theoretical framework for gravity models of travel based on individual utility. In a travel-gravity model context, Eilat and Einav (2004) and Culiuc (2014), among others, study the determinants of bilateral travel flow by analysing a vast array of geographic, cultural and economic variables through time. Keum (2010) and Massidda and Etzo (2012) use panel data methods to explore the determinants of inbound tourism to South Korea and Italy respectively. Other studies have used the gravity model to explore the role of specific policies or events on cross-border travel. For example, the role of infrastructure on tourism (Khadaroo and Seetanah, 2008), the impact of visa restriction on travel (Neumayer, 2010), the role of mega-sporting events on inbound tourism (Fourie and Santana-Gallego, 2011), and the effect of cultural ties (especially religious affiliation) on inbound tourism to the US (Vietze, 2012).

In general, the gravity-based models find that income (in countries of origin and destination), relative price levels (including exchange rate in some cases), cultural and geo-

graphic proximity, and shocks and policies matter for cross-border travel. Specifically higher income of countries of origin and destination, geographic proximity, cultural similarity (for example same language) boost travel. On the other hand, prices in the country of destination and exchange rates (domestic currency in terms foreign currency), and visa requirements discourage travel. However, responses of travel to those variables are not uniform across regions. For example, Eilat and Einav (2004) find exchange rates matter mainly for tourism to developed countries.

The second category of studies views tourism as a distinct sector from other forms of trade that requires a separate treatment. Most studies in this category focus on tourism demand modelling and forecasting dealing with specific factors such as income, prices (consumer prices index or exchange rate), and transportation costs (Crouch, 1994). Most of these studies focus on tourist arrivals to a single country from either a specific selection of countries or from the rest of the world. Out of 119 published papers on tourism between 2000 and 2006 reviewed by Song and Li (2008), more than 95% focus on arrivals of tourists to a single country. While such studies can shed useful insights on the evolution of tourism patterns in a single country, comparison among various tourist destinations is not possible.

A detailed review of 80 empirical studies on international tourism demand conducted from the 1960s up to late 1980s by Crouch (1994) reveals that 84% of them employed OLS. Several studies have also used the old-fashioned Cochrane-Orcutt based regressions as a means of dealing with serial correlation issues. The majority of these studies were based on annual time-series data. A meta-analysis of these studies by the same author Crouch (1995) finds that in 70% of the cases the income elasticity of demand is found to be greater than unity, indicating that tourism is a luxury commodity. He also finds the sensitivity of tourism to income varying from region to region. For example, the developed part of Asia (mainly Japan) has the highest elasticity of income. In 69% of cases, income has had a positive effect on tourism demand as expected. The remaining negative elasticity

of income could point to a strong income effect (budget constraint) or complementarity with alternative destinations (Crouch (1992) as cited in Crouch (1994)). Studies that modelled exchange rate separately from destination prices (assuming traveller would be more sensitive to such measures) find a stronger exchange rate effect of tourism rather than price. In addition to economic factors (income and prices), several early studies included dummies to account for shocks such as political unrest, special events (such as Olympics), and travel restrictions (limits on foreign spending).

Studies on determinants of tourist demand in the last five decades have consistently (but to varying degrees) shown that income of origin country, relative prices in origin and destination country, and exchange rates as the most important factors (Crouch, 1994; Li et al., 2005; Song and Li, 2008). Most studies focus on tourism flows into a single country or into a select set of countries, which mainly comprise countries from Europe, North America and the developed parts of Asia. As pointed out in Li et al. (2005) tourism studies in the 1990s onwards paid more attention to regression model diagnostics than those conducted earlier.

Most of the travel studies have tried to incorporate the role of various shocks that can affect estimation such as the incidence of Olympics or the oil price shocks of the 1970s. However, a crucial policy tool in cross-border travel (i.e., visa policy) has been rarely studied. Countries use visas as the ultimate tool to allow or hinder access to their borders. Many countries exempt the citizens of certain countries from visa requirement to boost tourism.

Two notable studies that deal with student visas are Jena and Reilly (2013) and Shih (2016). Jena and Reilly (2013) investigate the determinants of UK student visa demand from developing countries and find bilateral exchange rate to be a more important factor than GDP of the source country. They also find no statistically significant effect of monetary cost of visas on demand for student visas. Shih (2016) finds that issuance of

H-1B visa (a non-immigrant visa that allows US companies to employ foreign workers) to a country significantly increases the number of international students from that country implying that flexible visa policies encourage inbound student mobility.

The few studies that incorporated visa in the context of cross-border travel include Neiman and Swagel (2009), Neumayer (2006), and Neumayer (2010). Neiman and Swagel (2009) explores the reasons for reduction of inbound travel to the US after the 9/11 terrorist attacks by comparing travel from countries the under the US Visa Waiver program with those that are not. Neumayer (2006) and Neumayer (2010) investigate the role of visas on cross-border flows of people, and find a detrimental impact of visas on travel. However, Neumayer acknowledges that the impact of visas in his studies may have been underestimated due to potential multicollinearity as the other covariates that affect travel such as distance could also affect visas.

3.3 Data, Definitions, and Descriptive Statistics

3.3.1 Travel and Visa Policies

We measure bilateral outbound travel by the log of the total number of travellers from country 'i' to country 'j' in 2005 and 2010 for tourism, personal and business purposes. We construct dyads of the bilateral outbound travel from arrival data recorded by national statistical offices and reported to UNWTO. The data on arrivals are obtained from UNWTO (UNWTO, 2014).[3]

The bilateral outbound travel data constitutes travel for business and leisure (personal and tourism) purposes. However, the data are not disaggregated into business and leisure. Disaggregated data for business and leisure are only available on a country basis, but not a bilateral basis from the UNWTO. For example, a country disaggregates total arrivals

[3]We construct the dyads by consolidating the separate excel files that the UNWTO keeps for each country.

from the rest of the world as 'business' and 'leisure', but not arrivals from each country (bilateral basis). From aggregate country-level data, the proportion of business and leisure arrivals differs from country to country. In countries where the tourism sector contributes a significant share of GDP, the proportion of arrival for leisure is higher than for business. For example, in 2012 Dominican Republic, a highly tourism-dependent country, had 97% of arrivals for leisure. Similarly, in the same year France, with a strong tourism sector, had 88% of its arrival for leisure. On the other hand, China, Ethiopia, and the UK had 77%, 68%, and 77.5% of their arrival for leisure (UNWTO, 2014).

The collection and recording of inbound travel differ across countries. Some countries record arrivals at borders while others report arrivals at hotels and similar establishments. Close to 90% of the countries report arrivals at borders. Among those countries that record arrivals at borders more than 70% of them exclude same-day travellers. Such variation in collection and recording methods could pose a bias in cross-country analysis. However, since each country's way of recording applies consistently to all its sources of travellers, the potential bias due to a difference in measurement approaches is attenuated in gravity-based models. Examples of recent studies that use these data in gravity models include Eilat and Einav (2004), Andersen and Dalgaard (2011), and Culiuc (2014).

Visa policies take three forms - visas before arrival, on arrival, and exemption. Visas on arrival are mainly motivated by a need to generate revenue from fees rather than prohibiting inbound travellers (Neumayer, 2010). Hence, for the purpose of this study we construct a dummy variable for visa where '*visa on arrival*' and '*visa exemption*' are taken as 'non-restrictive'; and the '*visa prior to arrival*' as 'restrictive'. The 'non-restrictive' takes a value of zero and 'restrictive' takes a value of one. Visa data for 2005 and 2010 are obtained from Neumayer (2006) and Lawson and Lemke (2012) respectively.[4] Since

[4]In the 2010 visa data if a visa is in principle available upon arrival, but is very difficult to obtain; it is categorised as restrictive and hence assigned a value of one. These are very few cases and do not prohibit comparison of the 2005 and 2010 data.

visa policies hardly changed between 2005 and 2010, a fixed effect panel data analysis is not appropriate, as nearly all of main variables of interest do not vary with time. Hence, we separately analyse the 2005 and 2010 data on a strictly cross-sectional analysis basis.[5]

Data on bilateral visa policies of our sample countries reveal that about 62% and 74% of the cases are characterised by reciprocity in 2005 and 2010 respectively. Among those with reciprocal visa policies around a third exempt visa between each other, while the remainder imposes them on each other. In the remaining 38% (for 2005) and 26% (2010) of cases, however, visas are not reciprocal; and generally travellers from richer countries are exempted from visa while travellers from poorer countries require them. We address the endogeneity concern by controlling for GDP of origin and destination countries. However, the key source of endogeneity is unobserved common factors affecting both visas and travel that prompted us to use Instrument Variable Estimator.

We use the United Nations General Assembly Voting Affinity Scores (henceforth simply 'Affinity Scores') as instruments for visas. The affinity scores reflect the voting behaviour of member states in voting at UN general assemblies. As such they reflect preferences of states about foreign policy. The similarity of voting can reflect the quality of the bilateral relationship between countries and hence can directly affect visa policies. Data on UN Voter affinity scores are from Strezhnev and Voeten (2012). Details of its construction are provided in the next section. We construct 5-year averages of the affinity scores to minimise potential measurement errors.

The destination of travellers, shown in Table 3.1 reveals that the majority of travel is intra-continental in nature. About 60% or more of all temporary cross-border travel takes place within the travellers continent in all continents except Oceania, emphasising the potential importance of distance as an opportunity cost of travel. Moreover, language and cultural similarity could also play a decisive role in such trips. In addition, geographic

[5]Visa data for the 2005 and 2010 analyses are collected in 2004 and 2008/09 respectively.

Table 3.1: **Direction of Travel: Average of 2005 and 2010**

	Destination (%)						
Origin	Africa	Asia	Caribbean	Europe	North America	Oceania	South America
Africa	**83.02**	10.70	0.01	4.34	1.31	0.31	0.30
Asia	2.33	**71.25**	0.07	17.56	6.58	1.88	0.32
Caribbean	0.53	1.04	**59.31**	1.57	33.19	0.03	4.32
Europe	4.17	8.93	0.46	**82.43**	3.01	0.29	0.72
North America	1.23	8.53	6.42	18.00	**62.97**	0.57	2.29
Oceania	3.33	50.32	0.25	26.33	12.24	**6.19**	1.34
South America	1.38	2.96	4.25	10.55	17.10	0.23	**63.54**

Source: author's computation based on UNWTO (2014)

proximity could imply countries are more likely to be in regional trade agreements or local customs unions of some sort, which entails fewer visa restrictions among members thus boosting cross-border travel.

A limitation of the travel dataset is that although, in principle, it covers all countries of the world; a few missing values and many zeros are observed. The missing values could indicate non-existence of bilateral travel and hence are not recorded or could be a measurement error. Andersen and Dalgaard (2011) who use the same dataset, argue that potential measurement error arising from this is knowable under classical assumptions as it only increases the variance of the error term, and hence the estimated variance of the parameters. Missing values in our dataset account for only 2.8% and 4.6% of the bilateral outbound travel in 2005 and 2010 respectively. The majority of the sources of missing values are a few developing countries not keeping records of inbound travellers and countries in conflict.[6] Countries that did not record inbound travellers in both 2005 and 2010 are not included in our sample. Moreover, countries that kept track of records for only either 2005 or 2010 are also dropped (Iran, Iraq, Kyrgyzstan, Mali, and Sierra Leone for 2005; and Antigua and Barbuda, Bangladesh, Guinea, Ghana, Kenya, Libya, Guinea-Bissau, and St. Kitts and Nevis for 2010). This is done to ensure the same sample of

[6] As discussed preceding sections, we construct dyads of the bilateral outbound travel from arrival data recorded by national statistical offices and reported to UNWTO.

countries is used for 2005 and 2010 to facilitate comparison. However, outbound travellers from these countries as recorded by the respective destination countries are included in the study. Hence, some of these countries appear in the list of origin countries used in the analysis reported in Table B.1 in the appendix. In cases where countries recorded zero travel in either of the year and missing in the other year; the missing values are replaced by zero as they likely show zero travel (these account for about 1% of all bilateral flows in 2005 and about 0.6% in 2010).

Zero bilateral outbound travel accounts for nearly two-thirds of our sample. Under log-linearised models, zero values in the dependent variables are not defined which entails selection problem for the analysis. If the zero values have a similar distribution as the non-zeros (zeros simply indicating lower values), there would not be selection problem. However, if the zeros indicate some unobserved unique characteristics, simply omitting them from the analysis results in biased estimates. To tackle this problem we use a '*Heckman two-stage selection*' procedure.

As shown in Table 3.2, and as also indicated in Eilat and Einav (2004), the zeros tend to be concentrated in smaller countries. Regarding area of origin countries, the proportion of countries with zero values ranges from about 78% for the smallest countries (first decile) to 46.5% for the largest countries (tenth decile). Hence, since country size measured by area affects whether a country has non-zero travel or not, it can serve as an instrument for selection as long as it does not influence the level of travel.[7]

Due to the count nature of travel data, we also use the Poisson model. To tackle a large number of zeros in the data, we use the Zero-Inflated Poisson (ZIP) Model.

A descriptive comparison of travel patterns of a typical developed country (United

[7] As shown in subsequent sections among the various measure of size of a country, the area size of the origin countries is a significant determinant of whether bilateral travel is positive or not, while it does not affect the level of bilateral trips (Table 3.6 suggests that it can be an appropriate instrument for selection in the Heckman model).

Table 3.2: **Incidence of Zeros in Bilateral Travel and Country Size**

Deciles of area size of countries of origin											
Travel (%)	1	2	3	4	5	6	7	8	9	10	Total
Zeros	78.18	77.70	61.68	71.07	62.98	70.86	50.49	58.00	66.15	46.51	64.43
Non-Zeros	21.82	2.30	38.32	28.93	37.02	29.14	49.51	42.00	33.85	53.49	35.57
Total	100	100	100	100	100	100	100	100	100	100	100

Source: author's computation based on UNWTO (2014)

Kingdom) and developing country (Nigeria) in more detail can shed light on the nature of travel. Table 3.3 compares travel patterns of the UK with Nigeria. It reveals the UK with a population size of less than half of Nigeria, had five times the GDP per capita, five times inbound travel, and 102 times outbound travel than that of Nigeria in 2010. Moreover, a British traveller faces visa restrictions in about 41% of the 185 countries with data on visas. The corresponding figure for Nigeria is only 89%. In addition, the UK has much more outbound traveller than inbound, the reverse is the case for Nigeria.

Table 3.4 provides top ten destinations and origins for the UK and Nigeria based travellers. Seven out of the main ten destinations for British traveller are also sources of British inbound travel implying symmetric travel pattern. On the other hand, Nigeria's main outbound destinations are different from its primary sources of inbound travellers. Like the UK, Nigeria has a large number of visitors from its neighbours signifying the importance of local geographic and cultural ties in travel. However, Nigeria's leading travel destinations comprise the UK, USA and Saudi Arabia, which are all located farther away. As indicated in Andersen and Dalgaard (2011) the popularity of these destinations could be a result of colonial ties (UK), and Nigeria's religious composition (to the Haj in Saudi Arabia due to its large Muslim population). Nigeria's top three visitors are members of the Economic Community of West African States (ECOWAS) as is Nigeria. This allows, among other things, visa exemptions to citizens of member states. British travellers do

not require visas in nine of their top destinations (Egypt being an exception). Citizens of the top-ten visitors to the UK do not need a visa to visit the UK. This indicates that visa exemption can have a positive role in boosting travel.

Table 3.3: **Aggregate Characteristics: UK vs. Nigeria in 2010**

	UK	Nigeria
POP (millions)	63	160
GDP per capita (USD)	26984.1	5375
Total Outbound (millions)	63.5	0.6
Total Inbound (millions)	28	6
Visa Restrictions (%)	41	89.1

Source: author's computation based on UNWTO (2014), Lawson and Lemke (2012), and World Bank (2013)

Table 3.4: **Travel Patterns of United Kingdom and Nigeria in 2010**

Top 10 Destinations	UK			Nigeria	
Destination	Visa Required	Outbound (Millions)	Destination	Visa Required	In Millions
Spain	No	12.4	UK	Yes	0.17
France	No	11.6	USA	Yes	0.08
Ireland	No	3.9	Egypt	Yes	0.06
USA	No	3.9	Saudi Arabia	Yes	0.05
Italy	No	3.3	South Africa	Yes	0.05
Turkey	No	2.7	China	Yes	0.04
Greece	No	1.8	Israel	Yes	0.03
Germany	No	1.8	India	Yes	0.02
Netherlands	No	1.5	Benin	Yes	0.02
Egypt	Yes	1.5	Senegal	No	0.01
Top 10 Visitors	**UK**			**Nigeria**	
Origin	Visa Required	Inbound (Millions)	Origin	Visa Required	In Millions
France	No	3.62	Niger	No	1.27
Germany	No	3	Benin	No	0.86
USA	No	2.71	Liberia	No	0.23
Ireland	No	2.63	Cameroon	Yes	0.23
Spain	No	1.81	Chad	Yes	0.19
Netherlands	No	1.76	Italy	Yes	0.14
Italy	No	1.47	Sudan	Yes	0.14
Belgium	No	1.14	France	Yes	0.13
Poland	No	1.1	Germany	Yes	0.13
Australia	No	0.99	Senegal	No	0.13

Source: author's computation based on (UNWTO, 2014) and Lawson and Lemke (2012)

3.3.2 Other Covariates

Other main determinants of cross-border travel identified in the literature are the following.

- Economic factors - GDP and price levels of countries of origin and destination
- Geographic characteristics (distance, contiguity, areas of countries of origin and destination)
- Historical ties (colonialism and common languages)
- Population size of countries of origin and destination
- Trade and custom's union (World Trade Organization (WTO) and Schengen areas).[8]

Data on geographic characteristics and historical ties are obtained from the Centre d'Etudes Prospectives et d'nformations Internationales (CEPII).[9] GDP, Population and price data are obtained from World Bank's World Development Indicators (WDI).[10] Data on travel and related expenditure and employment are obtained from the World Travel and Tourism Council (WTTC, 2014).

Definitions and summary statistics of major variables of interest are provided in Table 3.5. The list of countries included in the study are reported in Table B.1 of the appendix.

[8] Before 1995, the WTO was under the General Agreement on Tariffs and Trade (GATT) framework.

[9] Available in CEPII at www.cepii.fr

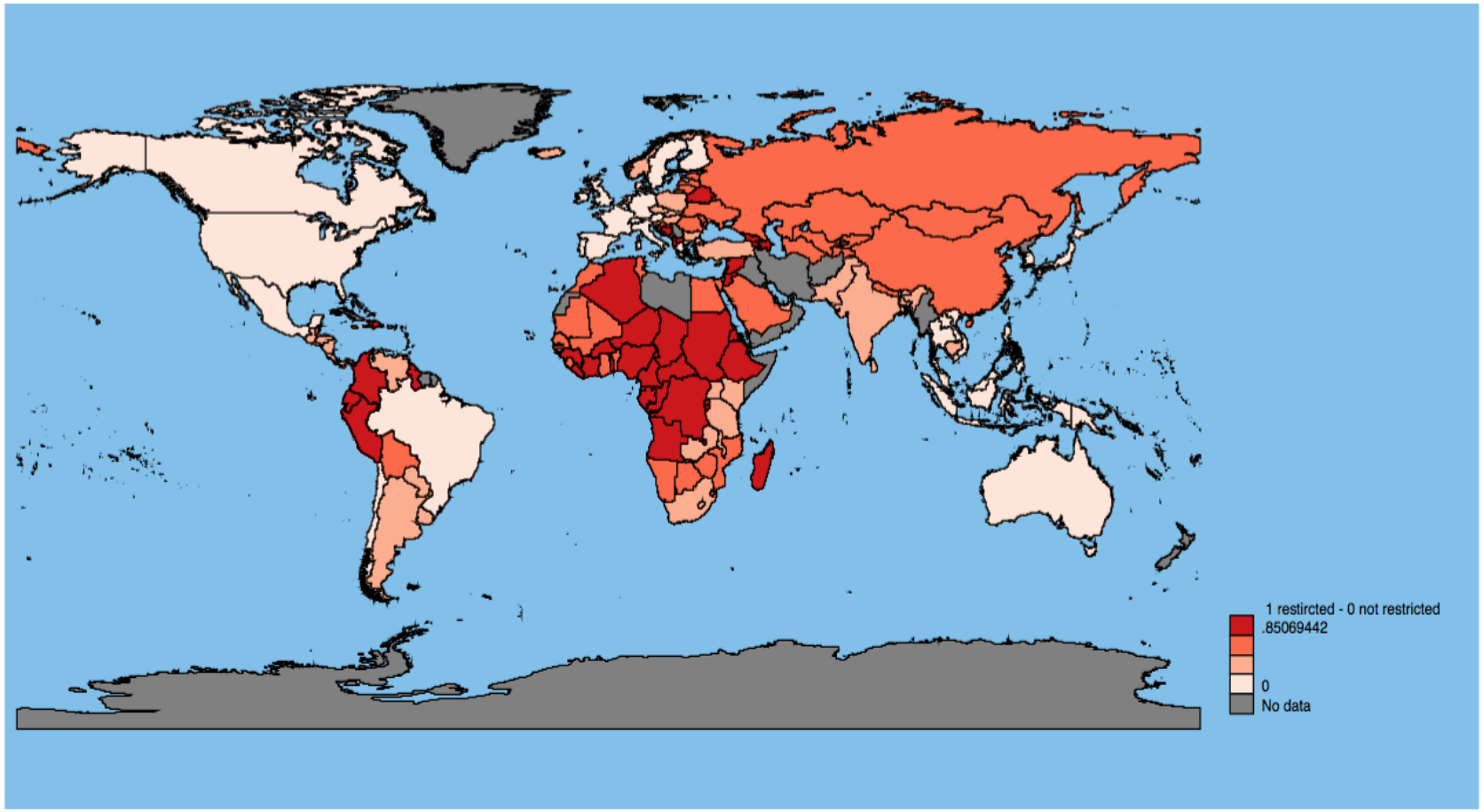
[10] World Bank (2013)

Table 3.5: **Summary Statistics of Cross-Country Data for 2005 and 2010**

		2005					2010			
Variable	Description	N	Mean	SD	Min	Max	Mean	SD	Min	Max
OUTBOUND	Outbound Travel (in thousands)	11637	38	583	0	37400	41	491	0	25900
OUTBOUND_P	1 if outbound travel is non-zero	11637	0.36	0.48	0	1.00	0.36	0.48	0.00	1.00
LOUTBOUND	Log of Outbound Travel	4139	7.51	3.11	0	17.44	7.92	3.02	0.00	17.07
VISA	1 if travellers from country i to j need a visa before arrival	11637	0.59	0.49	0	1.00	0.69	0.46	0.00	1.00
UN_VOTE_AFFINITY	UN Voting Affinity Scores	11637	0.61	0.34	-0.77	1.00	0.66	0.31	-1.00	1.00
LGDP_PC_ORIGIN	Log of Real GDP per capita of origin country (2005 constant prices)	11637	7.96	1.59	4.57	10.86	8.06	1.56	4.65	10.86
LGDP_PC_DEST	Log of Real GDP per capita of destination country (2005 constant prices)	11637	7.39	1.53	4.57	10.86	7.51	1.50	4.65	10.86
CONTIGUITY	1 for contiguity	11637	0.02	0.14	0.00	1.00	0.02	0.14	0.00	1.00
LDISTANCE	Weighted distance (pop-wt, km)	11637	8.74	0.77	4.74	9.89	8.74	0.77	4.74	9.89
LPOP_ORIG	Log of population of origin country	11637	15.75	1.77	9.90	20.99	15.81	1.77	9.93	21.01
LPOP_DEST	Log of population of destination country	11637	15.80	2.12	9.90	20.99	15.88	2.13	9.93	21.01
LAREA_ORIG	Log of Areal size of origin	11637	11.70	2.21	5.20	16.65	11.70	2.21	5.20	16.65
LAREA_DEST	Log of Areal size of destination	11637	11.71	2.49	5.20	16.65	11.71	2.49	5.20	16.65
COMMON_LANGUAGE	1 if origin and destination share common official language	11637	0.16	0.37	0	1	0.16	0.37	0	1
COLONY	Origin and destination had colonial relationship	11637	0.01	0.12	0	1	0.01	0.12	0	1
WTO	1 if origin and destination are members of WTO	11637	0.65	0.48	0	1	0.65	0.48	0	1
SCHENGEN_ORIGIN	1 if origin is a member of Schengen	11637	0.19	0.39	0	1	0.19	0.39	0	1
SCHENGEN_DEST	1 if destination is a member of Schengen	11637	0.08	0.28	0	1	0.08	0.28	0	1

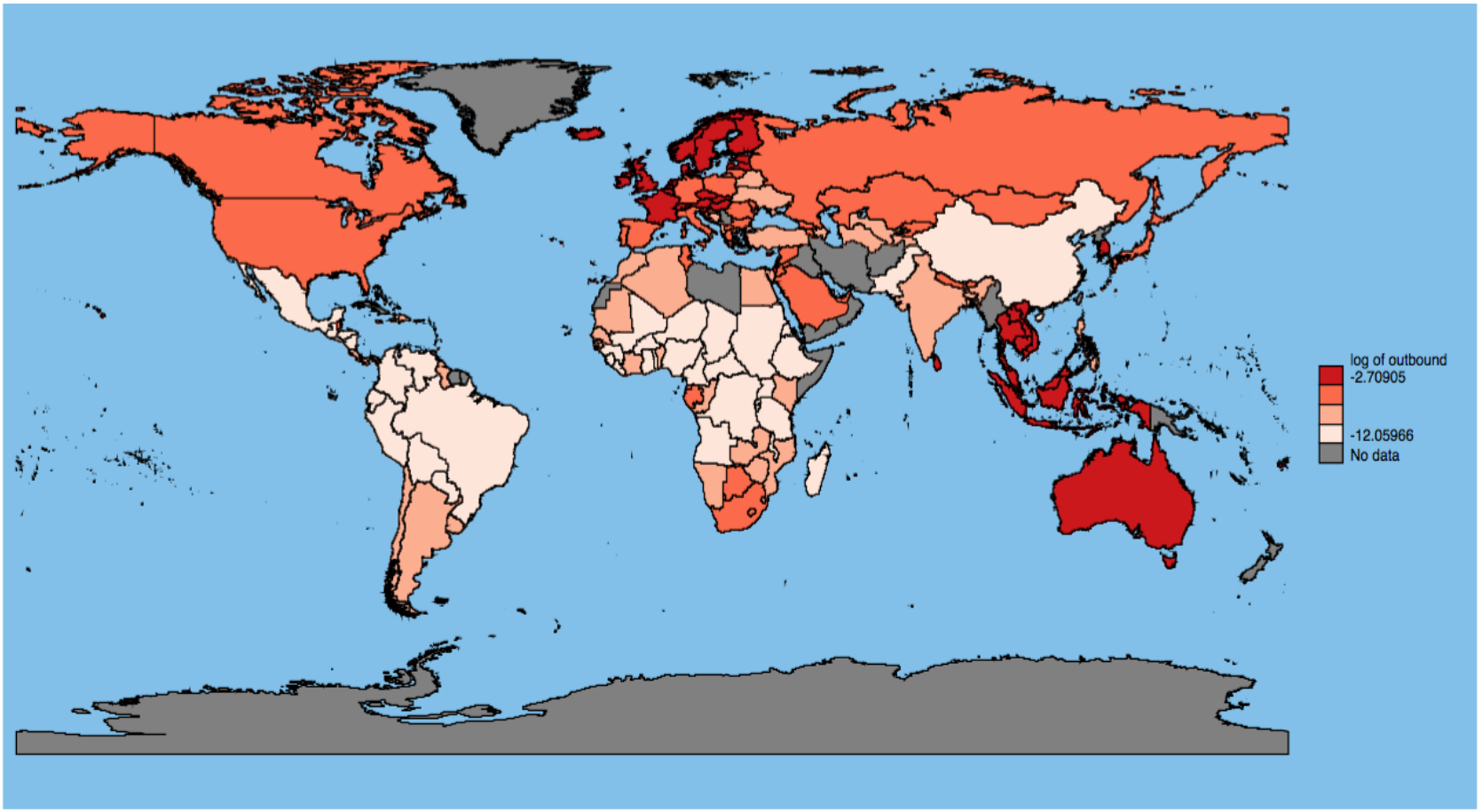
A visa is probably the most powerful tool a country has in controlling the volume of inbound travellers. Some countries establish bilateral agreements for visa exemption allowing citizens to enter each other's country for a limited period of time. This is usually the case among pairs of more developed countries. Others require symmetric visa requirements on both sides. In some cases, usually less developed countries, exempt citizens of some countries (usually developed ones) from visa requirement unilaterally for a limited period. Hence, this renders visas dependent on income. Figures 3.1 and 3.2 show maps of visa barrier and travel patterns for most countries of the world. Countries with fewer visa constraints enjoy higher travel levels and vice versa. However, countries that face less visa constraints tend to be richer countries. Hence, the higher travel levels of these countries are a result of a combination of higher income (affordability) and fewer visa barriers (access).

In summary, an overview of the key findings in the descriptive data suggests that richer countries face fewer visa restriction, travel more, and geographic proximity and socio-economic ties favour cross-border travel. The apparent negative correlation between visa restriction and travel depicted in Figure 3.3 and 3.4 can also be observed within continents as shown in B.2 in the appendix.



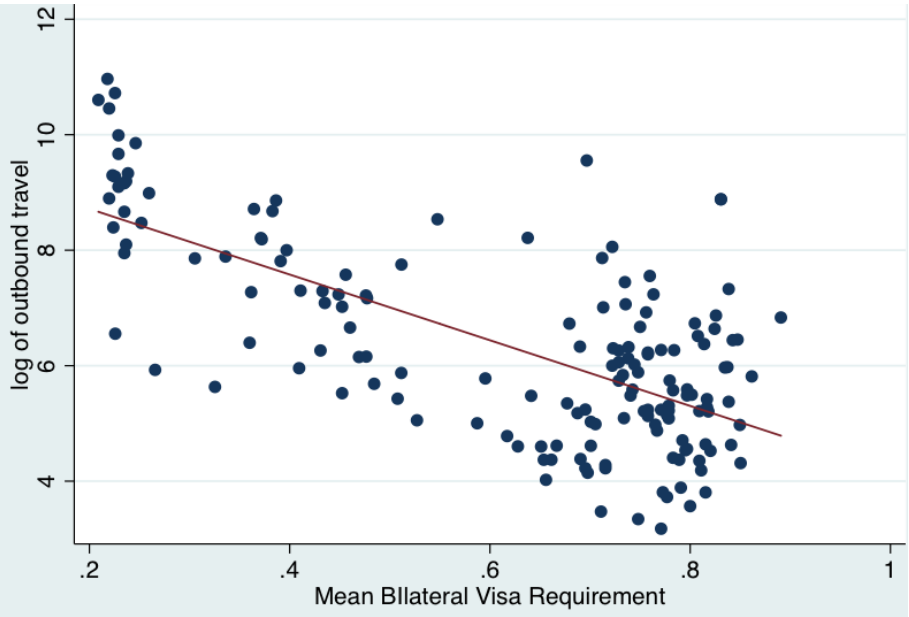
Note: Average of 2005 and 2010 Visa Restriciton Data.
Number of countries included 158 (with data) .
Mean bilateral visa requirement for a country of origin is the proportion of destination countries that require visas for travellers from that country. For example, if half of the destination countries require visas from travellers from an individual origin country, the mean visa requirement for that country would be 0.5.
Source: Computed from Neumayer (2006) and Lawson and Lemke (2012).

Figure 3.1: **Access beyond Borders: Visa Restrictions**



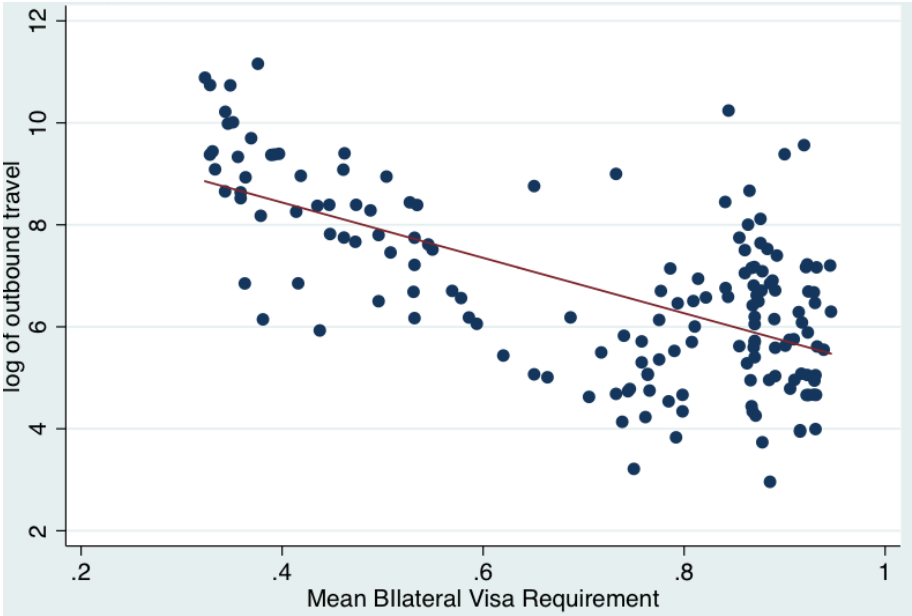
Note: Average of 2005 and 2010 Per Capita Travel .
Number of countries included 158 (with data) .
Source: Computed from (UNWTO, 2014) and World Bank (2013) .

Figure 3.2: **Outbound Travel Per Capita**



Source: Computed from (UNWTO, 2014) and Neumayer (2006).
Note: Mean bilateral visa requirement for a country of origin is the proportion of destination countries that require visas for travellers from that country. For example, if half of the destination countries require visas from travellers from an individual origin country, the mean visa requirement for that country would be 0.5.
Number of countries included 158 (with data) .

Figure 3.3: **A Scatter Plot of Visas and Outbound Travel: 2005**



Source: Computed from (UNWTO, 2014) and Lawson and Lemke (2012).
Note: Mean bilateral visa requirement for a country of origin is the proportion of destination countries that require visas for travellers from that country. For example, if half of the destination countries require visas from travellers from an individual origin country, the mean visa requirement for that country would be 0.5.
Number of countries included 158 (with data) .

Figure 3.4: **A Scatter Plot of Visas and Outbound Travel: 2010**

3.4 Econometric Methodology

Gravity models stipulate that trading interactions among countries are negatively correlated with distance and positively correlated with country size as measured by their GDP. This relationship has become an empirical regularity in the literature. Since travel can be considered as a type of trade in services, gravity models have been widely used to study it. As indicated in section 3.2, several studies have found that gravity models explain trade in services including cross-border travel at least as well as trade in goods (see, for example, Kimura and Lee (2006) and Culiuc (2014)). We use this basic model and extend it to include other relevant variables such as visa requirements for investigating the determinants of cross-border flows of people. A basic version of the gravity equation (see, for example, Deardorff (1995)) is specified as

$$F_{ij} = \frac{Y_i Y_j}{D_{ij}} \tag{3.1}$$

where F_{ij} captures flow of exports, FDI, or cross-border travel depending on the context of the study from country i to j , Y_i is GDP per capita of origin; Y_j GDP per capita of destination, and D_{ij} is the distance between them.

For estimation purposes, the literature has specified a natural logarithm form of the gravity model permitting coefficients to be interpreted as elasticities. As indicated in Frankel and Romer (1999) and other studies, the log-linear specification fits the data well. Extending the basic gravity model with other relevant covariates and taking the log form, our cross-border travel model is specified as

$$\ln(T_{ij}) = \mu + \alpha_1 \ln(Y_i) + \alpha_2 \ln(Y_j) + \beta V_{ij} + \delta \ln(D_{ij}) + \gamma' X_{ij} + \theta' W_i + \phi' Z_j + \varepsilon_{ij} \tag{3.2}$$

Where is $\ln(T_{ij})$ logarithm of travel from country i to j; Y_i is GDP per capita of country of origin; Y_j is GDP per capita of country of destination; V_{ij} is a dummy variable for visa (whether travellers from country i require visa to travel to country j; D_{ij} is distance

between country i and j ; X_{ij} a vector of geographic and socio-economic variables common to origin and destination, namely common border, common language, colonial relationship post 1945, and whether both are members of WTO; W_i is a vector of origin characteristics (population, area size, and Schengen membership), and Z_j is destination characteristics (population, area size, and Schengen membership).[11]

As indicated in the previous section, a significant challenge in empirical studies of bilateral travel data is that each country does not necessarily have travellers to each other country in the world, and hence there are many '*zero*' values. This is also a common problem in similar bilateral data such as trade, migration and FDI. The problem is that applying the logarithm automatically discards observations with '*zero*' values potentially resulting in information loss and potential econometric problems. Hence, it is imperative, to explore whether countries with zero travel levels are systematically different from countries with positive travel levels. We use Heckman Two-Step Procedure to check if there is potential selection into having a non-zero travel level. Exploring travel patterns in terms of the size of outbound travel and the probability of having non-zero travel reveals that smaller countries in terms of area size and population are less likely to have positive travel as discussed in section 3.3 and reported in Table 3.2. The reason is that travellers from very small countries are likely to be concentrated in a limited number of destinations, while having very few travellers to the rest of the world. Therefore, travellers from smaller countries, due to their small number, are likely to be recorded as zero in many destinations. We formally test this proposition by running a regression on levels of travel (log of outbound travel) and the probability of positive outbound travel using a set of covariates. Columns 1 and 4 of Table 3.6 provide regression estimates on levels for 2005 and 2010 respectively, while the corresponding probability regressions (probit) are given in columns

[11] We include a dummy for Schengen areas as there is free movement of labour among members and due to their common visa policies. Moreover, Frankel and Rose (2002) find a significant positive effect of common currency on trade, which may potentially also affect bilateral travel.

2 and 5 of the same table. The results show area size of origin country significantly affects the probability of having positive travel flows, while it does not significantly affect the level of travel indicating that it can serve as a valid instrument for the Heckman selection model. In order to explore the OLS estimates of column 1 and 4 of Table 3.6 with the full set of observations (which include zeros), we replicate it in Table B.2 of the appendix. The results remain robust.

OLS and Heckman two-step estimates are reported in Tables 3.6 revealing that selection is important as indicated by a negative and significant selection term (λ). Hence, ignoring the observations with zero values does lead to an incorrect specification. We use country area size of origin as the identifying variable for the Heckman selection process. The negative and significant selection term implies that the unobserved variables determining travel are negatively correlated with unobserved variables determining the probability of selection.

Table 3.6: **Determinants of Cross-border Travel: OLS with Heckman Selection**

	2005			2010		
ESTIMATION METHOD	OLS	SELECTION (PROBIT)	HECKMAN	OLS	SELECTION (PROBIT)	HECKMAN
DEP VAR. DEP VAR.	LOUT-BOUND	OUT-BOUND_P	LOU-BOUND	LOUT-BOUND	OUT-BOUND_P	LOUT-BOUND
VISA	-1.107***	-0.145***	-1.049***	-0.958***	-0.190***	-0.865***
	(0.067)	(0.031)	(0.069)	(0.065)	(0.036)	(0.068)
LGDP_PC_ORIGIN	0.740***	0.258***	0.646***	0.735***	0.260***	0.606***
	(0.020)	(0.011)	(0.036)	(0.021)	(0.012)	(0.035)
LGDP_PC_DEST	0.529***	0.302***	0.424***	0.476***	0.337***	0.317***
	(0.020)	(0.011)	(0.038)	(0.022)	(0.011)	(0.040)
CONTIGUITY	1.659***	0.216*	1.653***	1.539***	0.211*	1.547***
	(0.179)	(0.122)	(0.173)	(0.176)	(0.123)	(0.169)
LDISTSANCE	-1.319***	-0.545***	-1.119***	-1.303***	-0.548***	-1.028***
	(0.034)	(0.021)	(0.066)	(0.035)	(0.021)	(0.065)
LPOP_ORIGIN	0.838***	0.234***	0.746***	0.830***	0.231***	0.719***
	(0.025)	(0.015)	(0.033)	(0.026)	(0.015)	(0.032)
LPOP_DEST	0.715***	0.288***	0.606***	0.685***	0.265***	0.549***
	(0.019)	(0.012)	(0.040)	(0.019)	(0.012)	(0.036)
LAREA_ORIGIN	0.007	0.027**		0.023	0.029**	
	(0.021)	(0.012)		(0.022)	(0.012)	
LAREA_DEST	-0.044***	-0.070***	-0.018	-0.057***	-0.049***	-0.033**
	(0.016)	(0.011)	(0.018)	(0.016)	(0.011)	(0.017)
COMMON_ LANGUAGE	0.930***	0.450***	0.756***	0.787***	0.461***	0.548***
	(0.065)	(0.041)	(0.087)	(0.066)	(0.041)	(0.086)
COLONY	0.998***	0.047	1.009***	0.969***	0.064	0.971***
	(0.168)	(0.127)	(0.166)	(0.160)	(0.128)	(0.156)
WTO	0.298***	0.220***	0.223***	0.497***	0.250***	0.380***
	(0.068)	(0.032)	(0.071)	(0.066)	(0.032)	(0.071)
SCHENGEN_ORIGIN	0.219***	0.140***	0.159**	0.229***	0.175***	0.122*
	(0.069)	(0.042)	(0.068)	(0.067)	(0.042)	(0.066)
SCHENGEN_DEST	-0.290***	-1.195***	0.133	-0.317***	-1.254***	0.285*
	(0.089)	(0.059)	(0.148)	(0.088)	(0.060)	(0.148)
LAMBDA			-0.683***			-0.932***
			(0.210)			(0.203)
CONSTANT	-16.74***	-7.84***	-13.23***	-15.74***	-8.02***	-10.95***
	(0.480)	(0.301)	(1.205)	(0.492)	(0.305)	(1.174)
OBSERVATIONS	4139	11637	4139	4139	11637	4139
R-SQUARED	0.754		0.754	0.736		0.737

Note
Robust Standard errors in parentheses.
***, **, * indicate Significance at 1%, 5%, 10% level
OUTBOUND_P is a dummy variable that takes one for non-zero outbound travel, and zero for zero outbound travel
LAMBDA is the inverse mills ratio from a first stage probit

3.4.1 Instrumental Variable Estimation and Identification

OLS estimates of Equation (3.2) could be potentially biased due to the endogeneity of visas as discussed above. The main potential source of bias is that unobserved factors could affect both travel and visas simultaneously. Moreover, since some of the covariates in our model such as distance affect travel and visas simultaneously, OLS estimates possibly underestimate the role of visas (Neumayer, 2010).[12]

To overcome these empirical challenges, we use instruments for visas to effectively discern its causal impact on travel. Following the Czaika and de Haas (2014) study on the impact of visa policies on migration, we use the UN Voting Affinity Scores as instruments for visas. The affinity scores reflect the voting behaviour of member states in voting in UN general assemblies. As such they reflect preferences of states about foreign policy. The scores are constructed by Strezhnev and Voeten (2012). The affinity scores are computed based on Signorino and Ritter (1999) measure of similarity, which in the spirit of Euclidean distance, is computed as follows:

$$S^{ij} = 1 - \frac{2|P^i - P^j|}{d^{max}} \tag{3.3}$$

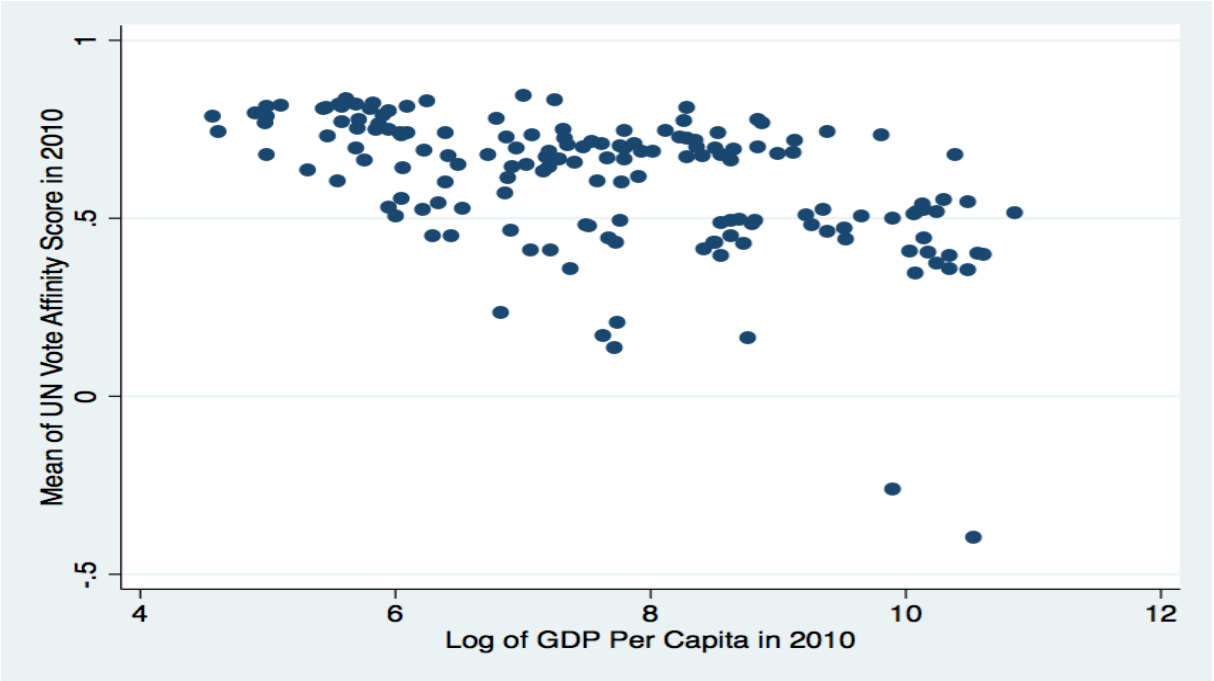
Where P_i and P_j are votes of country 'i' and 'j' on certain policies. The policy space (range of options) has a maximum disagreement (difference) of d^{max}.

In the UN general assembly let N be the number of issues that need decision in year 't'. Each vote on a certain policy/motion has one of three possible outcomes: *Yes=1*, *Abstain=2*, and *No=3*. The maximum possible difference in votes is *2*. Hence, the $S-score$ in our case would be

$$S^{un}_{ij} = \frac{\sum_1^N 1 - |P^i - P^j|}{N} \tag{3.4}$$

[12] Using the Durban-Wu-Hausman test of exogeneity of visas indicates that visas are indeed endogenous as shown in Table B.3 of the appendix B. Residuals estimated from regressions of visa and GDP on all exogenous variables are found to be significant in the original model of travel indicating that OLS estimates are not consistent.

The *S-score* ranges from −1 (if the two states maximally disagree) to 1 (if they agree on all resolutions).[13] Those affinity scores indicate the quality of bilateral relations between countries and hence can directly affect bilateral visa policies (see Czaika and de Haas (2014)).[14] On the other hand, there is no reason to assume that they would be systematically linked to GDP per capita of the countries involved. Figure 3.5 shows a scatter plot of the log of GDP per capita and average affinity scores of the countries included in the study. The Figure shows a weak correlation between income and affinity scores. The same scatter plot is provided in Figure B.1 in the appendix with country labels. The two high-income countries with very low-affinity scores are the United States and Israel. The correlation between income and affinity scores for the whole sample is weak.



Note: Log of GDP per capital (at 2005 constant prices) and Mean UN Voting Affinity Scores for the main sample fo countries: 2010.
Source: Computed from World Bank (2013) and Lawson and Lemke (2012).

Figure 3.5: **Scatter Plot of GDP per capita and Voting Affinity Scores: 2010**

[13] See Signorino and Ritter (1999) for derivation of the S-score.

[14] Czaika and de Haas (2014) use the UN Voting affinity scores as instruments for visa for their study on migration.

We use the affinity scores of 2004 for the 2005 study. Likewise, we use the affinity scores of 2009 for the 2010 analysis. This is because the visa data of 2005 were collected in 2004 and the visa data for 2010 were collected throughout in 2008/09.

In the first stage, we regress the endogenous variable separately on the instruments and the remaining exogenous variables. Thus, the reduced form equation is:

$$V_{ij} = \delta + \varpi S_{ij}^{un} + \vartheta' X_{ij} + \kappa' W_i + \pi' Z_j + \xi_{ij} \tag{3.5}$$

Where S_{ij}^{un} represents 'Affinity'; V_{ij} is a dummy variable for visa (whether travellers from country i require visa to travel to country j). X_{ij}, W_i, and Z_j capture common origin - destination, origin-only, and destination-only characteristics respectively as defined in Equation (3.2) above.

The exclusion restriction is that S_{ij}^{un} does not appear in Equation (3.2).

Following Wooldridge (2002), we include the instrument for selection along with all exogenous variables in the selection model from which we compute the inverse Mills ratio (λ). We then include λ as a regressor in the structural-equation originally specified as Equation 3.2.[15]

The strength of instrumental variables (relevance) is a key requirement in IV estimations. A weak instrument exacerbates finite sample bias in the IV estimates (Bound et al., 1995; Angrist and Pischke, 2008). Moreover, with weak instruments the IV estimator has also a significance bias and is poorly approximated by normal distribution making standard tests unreliable (Stock and Andrews, 2005).

We assess the strength of our instruments (relevance) based on the 'Anderson LM statistic' and 'Cragg-Donald' tests of weak instruments. For the instruments to be strong, the statistic should be above the critical values reported in Stock and Yogo (2005), which

[15] See Wooldridge (2002), Chapter seven, section 4, pages 567-569 for details regarding selection in models with endogenous regressors.

is the case in the regression models reported here. In both cases, hypotheses of weak instruments are strongly rejected implying negligible finite-sample biases. The F-stats for exclusion of instruments from the first stage regressions are well above the threshold of 10 suggested by Stock and Yogo (2005).

First stage results of the Instrumental Variables estimates are provided in Table B.5 for 2005 and 2010 in the appendix.[16] The instrument is significant at 1% level with the expected sign indicating a strong support for its relevance. A similarity of voting in the UN general assembly reflects the quality of the bilateral relationship between countries and hence is associated with fewer visa restrictions. The affinity scores explain about 20% of the variation in visa policies in both 2005 and 2010.

Since we use two instruments in our analysis (one to instrument for visa policy and another for selection), we can conduct an overidentification test. As reported in subsequent sections (Table 3.8), with the Hansen J Statistics of 0.07 [p-value 0.4] and 0.03 [p-value 0.86] for 2005 and 2010 respectively, our instruments can considered valid (orthogonal to the error terms of the structural model). In addition, in order to test for orthogonality of our instrument variable (United Nations Voting Affinity Score), we run a reduced form regression to check if it is related with travel. The result of this exercise is shown in Table B.4 for 2005 and 2010 in the appendix. In columns 1 and 2, we do not include the endogenous variable (visa) and find that the instrumental variable (UN voting affinity) is related with travel. However, once we control for visa in column 3 and 4, the instrument becomes insignificant indicating that any potential impact of the instrument is mediated through visas.

[16] The 'Anderson LM' and 'Cragg-Donald' tests of weak instruments reported with the first stage (Table B.5 in the appendix) are also reported in Table 3.8 for convenience.

3.5 Results and Discussion: Visas and Cross-boder Travel

3.5.1 Determinants of Visa Policies

Passport and visa systems are the primary tools to control the cross-border mobility of people. The passport has evolved from being a tool of the sovereign state to a fundamental instrument of an individual's cross-border mobility. The passport uniquely identifies each traveller, indicates their point of origin, and the country to which they can be deported if needed. As such the passport can be viewed as a document by which a sovereign country requests another sovereign country to protect the bearer (Salter, 2003).

A visa is a tool used by a sovereign country to allow or deny access to bearers of a passport. As such countries face the dilemma of allowing more people access to their borders and hence gain more tourism revenue, facilitate trade, and FDI among other factors. In addition, closing their borders to citizens of other countries for security and social-economic reasons such as foreigner competing for jobs, and diseases transmission (Salter, 2003; Neumayer, 2008).

To enhance mobility, a number of countries have bilateral agreements to exempt visa-free entry to passport holders of their partners. Some countries also exempt visa requirement for passport holders of certain countries unitarily, usually from developed countries to enhance tourism. Some regional trade agreements such as the EU and the ECOWAS also allow visa-free access to passport holders from member states. However, a systematic study of the determinants of visa policies is scare. To our knowledge Neumayer (2006) is the only study that attempts to explore the role of socio-economic, historical, and geographic factors on bilateral visa policy systematically. Neumayer (2006) finds that poorer, less democratic, and conflict-prone countries are more likely to face higher visa restrictions while trade and regional ties enhance visa exemptions.

In political science, the international relations, and political economy literature, the similarity of voting in the United Nations General Assembly has been used as a measure of

the quality of bilateral ties among countries. Some early studies on group or block voting behaviour in the UN General Assembly include Ball (1951) and Lijphart (1963). More recently, Alesina and Dollar (2000) use voting behaviour in analysing the determinants of the direction of foreign aid. Neumayer (2008) use an index constructed from the UN voting affinity data to measure a nation's ideological affinity.

We argue that countries with stronger bilateral ties as reflected in the degree of similarity in voting, reflects the strength of their foreign relations and hence is likely to affect their visa policies with each other. Countries that vote similarly are the ones with stronger foreign relations, and hence more likely to visa exempt each other's citizens.

We rely on the first stage regression estimates based on equation (3.5) reported in Table 3.7 to analyse the determinants of visa policies. However, we modify the first stage estimates to exclude the selection term, lambda, and to include the full set of observations including those with zeros in travel. We do this because selection is not a problem in the visa policy data, unlike the travel data which is characterised by a large number of zeros.[17] Since visa policy is a binary variable taking a value of either 0 or 1, OLS estimation is equivalent to estimating a linear probability model (LPM) in this case.

In both 2005 and 2010, a one unit increase in the voting affinity for countries with the average level of affinity decreases the probability of imposing visas on each other by 10 and 13 percentage points in 2005 and 2010 respectively.[18] The average affinity score in 2010 is 0.66 with a standard deviation (SD) of 0.31. An increase in one SD of affinity implies that reduction in the probability of imposing a visa by 4 percentage points. A one SD increase in affinity in the sample corresponds to a change from the Danish-Armeniam affinity score, which is 0.66 (equivalent to the mean score) to Danish-Belgian affinity

[17] Both the actual first stage estimates (Table B.5 in the appendix) that take into consideration selection in travel and the modified estimates (Table 3.7) provide largely similar results.

[18] The corresponding figures for the actual first stage reported in Table B.5 in the appendix are 22 percentage points in both 2005 and 2010

scores (0.97). Hence, a change in the quality of the bilateral relationship from the Danish-Aremeniam to Danish-Belgian reduces the probability of imposing visas between each partner country by 4 percentage points.[19]

Poorer countries of origin and destination have slightly higher visa restrictions than their richer counterparts as shown by the 2005 and 2010 estimates. Focusing on the 2010 estimates for countries of origin, a 10% increases in GDP per capita implies a decrease in the probability of visa restriction of 0.06 of a percentage point.

Sharing a common border (contiguity) reduces the probability of visa restriction by about 16 and 15 percentage points in 2005 and 2010 respectively. Having a common language between origin and destination reduces the probability of visa restriction by 15 and 11 percentage points in 2005 and 2010 respectively. WTO and Schengen members face a reduced probability of visa restriction compared to non-members.

Countries that are located far apart are more likely to impose visas on each other. Countries with bigger geographic size are more likely to impose visa restrictions on others. This could be due to many smaller countries in terms of geographic size (such as islands) that depend on tourism are less likely to impose visas on visitors compared to others.

In summary, bilateral foreign policy measured by the similarity of voting in the UN general assembly, geographic and historical ties, and customs unions strongly affect bilateral visa policies while the role of GDP is modest.

3.5.2 Determinants of Bilateral Cross-Border Travel

In this section, we discuss the determinants of cross-border travel with a focus on the role of visa policies.

Due to the endogeneity of visas, our analysis focuses on the results of the IV estimates

[19] With a mean visa restriction of 0.69 in 2010 (imposing visa restriction in 69% of the 159 countries included in the study), a 0.04 percentage point reduction in visa restriction equivalent to lifting visa restrictions for travellers from about nice countries.

Table 3.7: **Determinants of Visa Policies: LPM (Modified First Stage)**

	2005	2010
DEP. VAR.	VISA	VISA
	(1)	(2)
UN_VOTE_AFFINITY	-0.099***	-0.129***
	(0.014)	(0.014)
LGDP_PC_ORIGIN	-0.061***	-0.060***
	(0.003)	(0.003)
LGDP_PC_DEST	-0.039***	-0.078***
	(0.003)	(0.003)
CONTIGUITY	-0.159***	-0.148***
	(0.032)	(0.033)
LDISTANCE	0.053***	0.044***
	(0.006)	(0.006)
LPOP_ORIGIN	-0.013***	-0.021***
	(0.004)	(0.004)
LPOP_DEST	-0.011***	0.008***
	(0.003)	(0.003)
LAREA_ORIGIN	-0.009***	-0.000
	(0.003)	(0.003)
LAREA_DEST	0.065***	0.059***
	(0.003)	(0.002)
COMMON_LANGUAGE	-0.145***	-0.114***
	(0.012)	(0.011)
COLONY	-0.040	-0.045
	(0.038)	(0.036)
WTO	-0.179***	-0.077***
	(0.009)	(0.008)
SCHENGEN_ORIGIN	-0.061***	-0.055***
	(0.013)	(0.011)
SCHENGEN_DEST	-0.041**	-0.065***
	(0.017)	(0.017)
CONSTANT	0.853***	1.063***
	(0.092)	(0.083)
Observations	11637	11637
R-squared	0.215	0.297

Note
Robust Standard errors in parentheses.
***, **, * indicate Significance at 1%, 5%, 10% level
This is a modified version of the first stage of the IV estimation as it excludes the selection term (selection is not an issue with visas) and uses the full set of observations including those with zero travel.

provided in Table 3.8. Columns 1 and 3 report the selection estimations. We mainly focus on columns 2 and 4, which report the IV estimates for 2005 and 2010 respectively accounting for selection by Heckman two-step procedure.[20]

Comparing two countries one imposing visas on travellers from an origin country and another waiving visa for travellers from the same country implies that the country that requires visas has 80% and 73% fewer travellers from the origin country. Other studies that find a detrimental effect of restrictive visa policies on travel and associated activities include Neumayer (2010) and Song et al. (2012). Neumayer (2010) finds imposing visa reduces inbound travel by 52% - 63% without instrumenting visa policy. His results are comparable to our OLS estimates provided in columns 3 and 6 of Table 3.6 which report an effect of visa restriction to be 65% and 58% respectively. Song et al. (2012) finds strict visa regulations that followed the 1989 Tiananmen Square protests resulted in reduction in inbound travel to China by 21.1%-33% from major countries of origin.

The role of GDP per capita of origin and destination countries has been found to be a significant predictor of travel in previous studies. *ceteris paribus*, a 10% increase in GDP per capita results in roughly a 6% increase in outbound travel in both 2005 and 2010. Our results of the role of origin GDP are not statistically different from Culiuc (2014) who finds origin country GDP to have an elasticity of 0.5 - 0.6 on tourism using an extensive panel dataset of countries spanning over a decade or more. The positive role of income in origin country potentially reflects the ability to afford tourism. The income of the country of destination also has a strong positive role in attracting visitors in both years. Richer economies have more developed tourism infrastructure and promotion system.

Other determinants of the direction of travel identified in the literature and confirmed by our analysis are common border (contiguity); having a common official language; having

[20]The results are reasonably comparable to the OLS estimates based on Heckman selection reported in Table 3.6.

Table 3.8: **Determinants of Cross-border Travel: IV with Heckman Selection**

	2005		2010	
ESTIMATION METHOD	SELECTION EQUATION (PROBIT)	HECKMAN IV	SELECTION EQUATION (PROBIT)	HECKMAN IV
DEP.VAR	OUTBOUND_P	LOUTBOUND	OUTBOUND_P	LOUTBOUND
	(1)	(2)	(3)	(4)
VISA		-1.589***		-1.311***
		(0.370)		(0.374)
LGDP_PC_ORIGIN	0.274***	0.593***	0.274***	0.576***
	(0.012)	(0.044)	(0.012)	(0.045)
LGDP_PC_DEST	0.309***	0.392***	0.351***	0.284***
	(0.011)	(0.040)	(0.011)	(0.053)
CONTIGUITY	0.243**	1.577***	0.235*	1.492***
	(0.122)	(0.181)	(0.123)	(0.177)
LDISTSANCE	-0.547***	-1.055***	-0.556***	-0.994***
	(0.021)	(0.071)	(0.021)	(0.077)
LPOP_ORIGIN	0.239***	0.732***	0.234***	0.716***
	(0.015)	(0.033)	(0.015)	(0.033)
LPOP_DEST	0.289***	0.603***	0.264***	0.554***
	(0.012)	(0.042)	(0.012)	(0.037)
LAREA_DEST	-0.080***	0.014	-0.061***	-0.006
	(0.011)	(0.026)	(0.011)	(0.029)
COMMON_ LANGUAGE	0.466***	0.718***	0.481***	-0.052**
	(0.040)	(0.088)	(0.041)	(0.023)
COLONY	0.067	0.990***	0.075	-0.026
	(0.127)	(0.167)	(0.128)	(0.041)
WTO	0.248***	0.063	0.272***	-0.153***
	(0.032)	(0.119)	(0.032)	(0.016)
SCHENGEN_ORIGIN	0.151***	0.163**	0.179***	0.010
	(0.042)	(0.070)	(0.042)	(0.018)
SCHENGEN_DEST	-1.189***	0.140	-1.230***	-0.089**
	(0.059)	(0.151)	(0.059)	(0.039)
LAREA_ORIGIN	0.026**		0.029**	
	(0.012)		(0.012)	
UN_VOTE_AFFINITY	0.101**		0.035	
	(0.048)		(0.051)	
LAMBDA		-0.743***		-0.911***
		(0.216)		(0.210)
CONSTANT	-8.128***		-8.242***	
	(0.317)		(0.325)	
OBSERVATIONS	11637	4139	11637	4139
R-SQUARED		0.751		0.735
CRAGG-DONALD STATISTIC		66.04		67.99
ANDERSON LM STATISTIC		109.5		100.8
HANSEN J STATISTIC		0.702		0.0308
HANSEN P-VALUE		0.402		0.861

Note
Standard errors in parentheses.
***, **, * indicate Significance at 1%, 5%, 10% level
OUTBOUND_P is a dummy variable that takes one for non-zero outbound travel, and zero for zero outbound travel

a colonial relationship in the past, and being a member of WTO. All positively affect travel. Being a member of the Schengen area has a mixed effect on travel. The 2005 data shows that being a member of the Schengen area is associated with higher travel. It is, however, puzzling to observe that in 2010 destinations which are members of the Schengen area had fewer inbound travellers. One possible explanation is that travellers to Schengen area are only recorded at the point of first entry to the area, but not if they travel to other member states within it. This may result in under-reporting of travel within the Schengen area. On the other hand, distance has a detrimental effect on the volume of travel.

As a robustness check of the Heckman-based models, we conduct regression by continent to explore the role of heterogeneity in travel and other characteristics across continents. The results are shown in Tables B.6 and B.7 in the appendix B. The results are comparable to our main models. The negative impact of restrictive visa on outbound travel is apparent in all continents with travellers from Africa and Asia being the most sensitive to visa policies in destination countries.

In summary, the role of visa policies on cross-border travel is sizable. In fact, it is stronger than that of GDP and comparable to the effects of geographic location and historical ties like distance and common language respectively.

3.5.3 Alternative Models: Poisson and Zero-Inflated Poisson Regressions

Since cross-border travel data are discrete, non-negative count distributions such as a Poisson can be used to model them (see, for example, Cameron and Trivedi (2013) and Winkelmann (2013) for a discussion of count models in general, and Silva and Tenreyro (2006) for trade flows). The Zero-Inflated Poisson is a variant of the Poisson model designed to tackle the presence of a large number of zeros (see Greene (1994) for a discussion of Zero-Inflated Poisson models).

Results of the Poisson and Zero-Inflated Poisson along with their IV versions are given in Table B.8 and B.9 in the appendix respectively. They are in comport with the results of the Instrumental variable estimation with Heckman selection. This indicates that the main results are robust to different specifications and estimation techniques.

A potential downside of the Poisson distribution in the context of the cross-border travel in our data is heterogeneity in travel by region. Some regions such as Europe have particularly high outbound travel compared to countries in Africa and Asia. As robustness check we estimate Poisson and Zero-Inflated Poisson models by continent as shown in Tables B.10 and B.11 in the appendix. The results remain robust to this disaggregation.

In summary, several estimations techniques have shown that stringent visa policies have adverse effects on the cross-border movement of people potentially restricting revenue from the travel and tourism sector, associated employment, cross-border trade, FDI, and technology transfer. Below we explore the impact of restrictive visa on travel and tourism-related revenue and employment.

3.6 The Role of Visa Policies on Tourism Expenditure and Employment

Travel and tourism is one of the fastest growing sectors in many economies. In 2013, the direct share of travel and tourism in world GDP was about 3%. In the same year, including the indirect benefits (including wider effects from investment and supply chain) the share of travel and tourism expenditure to GDP was 9.5%. Similarly, in the same, year it contributed around 3.4% of employment directly, and 8.5% of employment including indirect sectors (WTTC, 2014).

In this section, we explore the role of visa restrictions on travel and tourism-related expenditures and employment at an aggregate (country) level. Visa is defined in this section as the average visa restrictions a country imposes on other countries in the world (can be taken as a visa restrictionction index). For example, a country that imposes a visa on all other countries in the world would have a measure of '1' while a country that does not require a visa for any other countries would have '0'. A country that imposes visa on half of the world countries has an average of 0.5 visa score. In our sample country, the mean visa score is 0.72, which mean countries require a visa from visitors from more than two-thirds of origin countries.

The travel and tourism-related expenditure is in billions of US dollars. We measure travel and tourism employment in thousands.

We run two OLS estimations for travel and tourism related expenditure (EXP) and employment (EMP)

$$\ln(EXP_i) = \eta + \beta V_i + \gamma' X_i + \phi' D_i + \epsilon_i \tag{3.6}$$

$$\ln(EMP_i) = \mu + \alpha V_i + \kappa' X_i + \theta' D_i + \upsilon_i \tag{3.7}$$

Where $\ln(EXP_i)$ and $\ln(EMP_i)$ are logarithms of travel and tourism-related expenditures and Employment respectively in country i; V is an index of visa restriction in country

i ; X_i a vector geographic and socio-economic characteristics of country i (GDP per capita, population, area size, WTO membership); D captures continent dummies for the location of country i. i is the destination country.

The results are reported in Table 3.9. The first column indicates expenditure estimates while the second column is for employment. In line with the bilateral analysis, restrictive visa policies have a detrimental impact on aggregate inbound travel, tourism expenditure and employment. *ceteris paribus*, on average a 10 percentage point increase in visa requirements reduces travel and tourism related revenues and employment by 11% and 8.6% respectively. For example, Uganda required visas for 82% of countries of origin which is equal to the average visa restriction level in our sample for 2010 (the aggregate analysis of expenditure and employment). Ukraine requires visas for 72% of countries of origin of its inbound travellers. Hence, a 10 percentage point increase in visa restriction corresponds to a change from a visa policy like Ukraine to that of Uganda. Therefore, *ceteris paribus*, compared to an average country with a mean level of visa restriction such as Ukraine, Uganda would have 11% and 8.6% less travel and tourism related revenues and employment respectively due to its restrictive visa policy.

An alternative way of looking at this is that a 10 point increase in visa restriction for the average country (with mean visa restriction value of 0.72) corresponds to a 14% increases in visa restriction. With a sample of 127 countries, this corresponds to additional visa restriction in 18 countries.[21] Neumayer (2011) finds a detrimental impact of restrictive visa policies on trade and FDI. Li and Song (2013) also find a significant economic loss in China due to visa restrictions introduced following the 1989 Tian'an Men Square episode and the 2008 Beijing Olympic games.

The results of the aggregate analysis are only suggestive, as we have not dealt with

[21] This interpretation of the regression coefficients assumes that destinations are not substitutes for each other. However, since there exists some form substitutability, the role of visa policies can be slightly lower than those reported.

potential endogeneity of visas due to lack of a suitable instruments. The UN voting affinity instrument is only valid in the context of bilateral data as opposed to aggregate data. In addition, the specification of the employment equation is arguably incomplete as other factors are likely to be important in its determination (e.g. local wages rates etc).

Table 3.9: **Visas, Tourism Expenditure, and Employment in 2010**

DEP.VAR	TRAVEL & TOURISM EXPENDITURE	TRAVEL & TOURISM EMPLOYMENT	Mean Values
VISA	-1.050**	-0.859**	0.721***
	(0.405)	(0.333)	(0.019)
LGDP_PC_DEST	0.886***	0.230***	7.996***
	(0.088)	(0.060)	(0.135)
LPOP_DEST	0.711***	1.011***	16.058***
	(0.061)	(0.055)	(0.167)
LAREA_DEST	-0.043	-0.098*	11.876***
	(0.053)	(0.052)	(0.204)
WTO_DEST	-0.182	-0.365**	0.858***
	(0.251)	(0.178)	(0.031)
NORTH_AMERICA_DEST	-0.286	0.470	0.024*
	(0.214)	(0.360)	(0.014)
SOUTH_AMERICA_DEST	-0.915***	0.204	0.087***
	(0.252)	(0.174)	(0.025)
OCEANIA_DEST	0.196	0.721*	0.031**
	(0.421)	(0.387)	(0.016)
ASIA_DEST	0.051	0.381*	0.213***
	(0.240)	(0.204)	(0.036)
AFRICA_DEST	-0.457	0.127	0.276***
	(0.319)	(0.236)	(0.040)
CARIBBEAN_DEST	-0.042	0.477**	0.094***
	(0.239)	(0.230)	(0.026)
LTOURISM_ EXPENDITURE_DEST			0.413**
			(0.179)
LTOURISM_ EMPLOYMENT_DEST			4.785***
			(0.158)
CONSTANT	-16.459***	-11.397***	
	(1.257)	(0.916)	
OBSERVATIONS	127	127	127
R-SQUARED	0.853	0.879	

Note
The dependent variables (TRAVEL & TOURISM EXPENDITURE AND EMPLOYMENT) are in logarithmic form
Robust Standard errors in parentheses.
***, **, * indicate Significance at 1%, 5%, 10% level

3.7 Conclusions and Recommendations

This chapter has studied the determinants of cross-border flows of people for tourism, personal, and business purposes lasting from one night up to one year. We particularly focus on the role of visa policies in cross-border travel.

We use instrumental variable estimation methods for outbound travel to a cross-section of countries for 2005 and 2010. We use the UN General Assembly Affinity Index, a measure of the quality of bilateral relations between nations, to instrument for bilateral visa policy. The need to instrument for visa policy arises due to possible omitted variable bias from potential unobserved factors driving both travel flows and visa policies. Moreover, even though bilateral visa policies tend to be reciprocal, there is an observed tendency for richer countries to be unilaterally visa exempted while imposing visas for travellers from poorer countries.

We use a Heckman two-step procedure to correct for potential selection bias due to the existence of many '*zeros*' in bilateral travel data. The zeros arise from the fact that many countries do not necessarily have travellers to all other countries. On average, a typical country in our sample had outbound traveller to only a third of the world's nations. Hence, correcting for potential selection bias in necessary. In addition to a Heckman model, we also use Poisson and Zero-Inflated Poisson models. We find consistent results regardless of the procedure we use.

We find that, *ceteris paribus*, imposing visa requirements reduces travel by about 80% and 73% in 2005 and 2010 respectively. Using aggregate country-level data, we also find an adverse impact of restrictive visa policies on travel and tourism-related revenues and employment.

Regarding the determinants of visa policies, we find that a strong bilateral foreign-relation between countries explains 22% of the quality of bilateral visa policies. Specifically, countries with opposing votes in the UN general assembly imposed visas among each other

in nearly all cases, while countries that voted similarly exempted visas for each other in 22% of cases in 2005 and 2010.

Other determinants of the direction of travel include a common border (contiguity), GDP of origin and destination country, historical and cultural ties (having a common official language and a colonial relationship post-1945), integration (WTO) all of which affect travel positively. On the other hand, distance has a detrimental effect on travel. These results are broadly in line with previous research.

Our findings highlight that countries can pursue flexible visa policies through bilateral negotiations, and thereby not only boost their tourism sector directly, but also potentially enhance knowledge transfer, trade, and FDI flows. However, we acknowledge these latter issues have not been the subject of investigation here, and should be treated explicitly as part of an agenda for future research.

Chapter 4

The Role of the United States Visa Waiver Program on Cross-border Travel

4.1 Introduction

The United States (US) travel and tourism sector comprises 2.6% of gross domestic product (GDP) and 3.6% of total direct employment; with indirect contributions to GDP and employment of 8% and 9.3% respectively. The share of the travel and tourism sector to GDP and employment has been steadily increasing since 2009 after the economy started to recover from the great recession and is forecast to grow in the coming years (WTTC, 2015).

Many countries bilaterally or unilaterally exempt visa requirements for holders of passports from certain countries to enhance their travel and tourism sector. Hence, the ability to cross the borders of other countries with or without a visa depends on the passport of the traveller. Passport holders from the developed world have the easiest access to other countries. Figure C.1 in the appendix is a map of the power of passports in terms of visa-free access; it reveals a clear pattern that richer countries such as those in Europe, North America, and Australia have easier access to the borders of other countries than

the rest of the world.

The US Visa Waiver Program (VWP) scheme allows visa-free access into the US for citizens of eligible countries and aims at boosting the travel and tourism sector (Monger and Barr, 2009). The Immigration Reform and Control Act 1986 established the VWP as a temporary pilot 'B-visa' program, formally known as 'Visa Waiver Pilot Program' (VWPP) (Public Law 99-603, 1986). This was made permanent on the 30th October 2000 through the Visa Waiver Permanent Act (Siskin, 2014). The 'B-Visa' refers to the temporary business and tourism category of visas. Visitors from eligible countries are allowed to stay in the US for up to 90 days for business and leisure purposes. Hence, the waiver only relates to the 'B-visa' category. Thus, the VWP waivers the need for a visa for temporary non-immigrant visitors.

As of January 2014 there are 38 countries (30 in Europe) eligible for the visa waiver (see Table C.1 for the current list of eligible countries). Eight of them were admitted to the VWP in 2008. Visitors from VWP countries are only required to authorise their visit online through the *Electronic System for Travel Authorization (ESTA)*. Therefore, they circumvent the screening process in the consular offices which otherwise would have been conducted.

The inclusion of countries into the VWP is done through negotiations between the US authorities and partner countries that want to benefit from the program. The main criteria for qualifying for the VWP program include the offer of reciprocal benefits for US citizens, a visa refusal of less than 3% for the previous year or an average of no more than 2% for the previous two years, issuance of machine-readable passports, and other security related agreements. However, in 2008 when the US admitted eight countries to its VWP, the two criteria relating to refusal rates were temporarily lifted from October 2008 to November 2009 (Siskin, 2011). For the period 2004-2012, VWP countries contributed about a third of all inbound travel to the USA.

The eight countries admitted to the VWP in 2008 are the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Slovakia, and South Korea. Since all eight countries were formally admitted into the VWP between November and December 2008, the refusal rate criteria did not apply to them. At this time, ten other applicants (namely, Argentina, Brazil, Bulgaria, Cyprus, Israel, Malaysia, Poland, Romania, Turkey, and Uruguay), - and designated 'roadmap countries' by US authorities, were in the process of negotiations to join the program (Siskin, 2014).[1]

Even though the VWP is a significant institutional tool for enhancing travel to the US and has sizable potential economic benefits, we are not aware of any published studies that have systematically evaluated the impact of the program. In this chapter, focusing on the period 2004-12, we employ Difference-in-Difference (Diff-in-Diff) estimation with panel data on US inbound travel from the eight countries newly admitted to the program in 2008 (treatment group), versus several comparison (control) groups. The comparison groups include the 'roadmap' countries; the rest of the world, which are not in the VWP; and the rest of the world excluding those admitted in 2008. Note that the control group categorised as 'the rest of the world, which are not in the VWP' refers to all countries, not in the VWP. For example, the UK is not included in this control group as it has been in the VWP since the end of the 1980s. It refers to countries not in the VWP in 2008 or before. The control group categorised as 'the rest of the world excluding those admitted in 2008' applies to all countries except those admitted to the VWP in the year 2008. For example, the UK is included in this group as it was admitted to the VWP before 2008. Moreover, Ethiopia is also included in this group as it has not been admitted to the VWP.

We also restrict the treatment and comparison groups to countries in Europe to reduce potential bias of estimates arising from heterogeneity and unobserved country characteristics.

[1] Argentina and Uruguay were previously in VWP in 1996-2002 and 1999-2003 respectively.

(countries not in the VWP in 2008 or before, for example the UK is excluded) (this includes countries admitted to the VWP before 2008, for example, UK)

In the previous chapter of this thesis, we attempted to identify the causal impact of visa policies using instrumental variable estimation methods. The current study develops the approach adopted in the previous chapter by focusing on the impact of the US VWP on inbound travel. The approach investigates the impact of the VWP on inbound travel by treating the policy as a quasi-natural experiment. This allows a neater identification of the impact of visa policies on travel compared to the previous chapter.

We find that, *ceteris paribus*, admitting a country to the program increases inbound travel from that country to the US by between 29% - 44% depending on the comparison group selected.

The chapter is organised as follows. In section 4.2, we present an overview of US visa policies and the VWP. Section 4.3 provides a review of the literature and is followed by section 4.4, which describes the data and presents some descriptive analysis. The econometric model is outlined in section 4.5. Section 4.6 presents the results and an accompanying discussion. Section 4.7 offers some concluding remarks.[2]

4.2 Overview of US Visa Policy and the VWP Program

Under the US Immigration and Nationality Act (INA) foreigners wishing to enter the US are categorised as either immigrants or non-immigrants. The immigrant category, also known, as Legal Permanent Resident, comprises people admitted to the US permanently, mainly including family-based and employment based migrants. The non-immigrant category consists of visitors who come to the US temporarily such as tourists, business visitors, international students, and diplomats (Wasem, 2011).

Since its establishment in 1986, the VWP has been admitting countries to the program

[2]The statistical software used to estimate the models in this chapter is Stata 13 (StataCorp, 2013).

at various times to enhance tourism, trade, and improve bilateral cooperation with other nations. The United Kingdom was the first country to be admitted in July 1988, followed by Japan in December 1988. The program initially planned to admit only eight countries. The US Congress passed several amendments to the VWPP until it was made permanent in October 2000 through the Visa Waiver Permanent Act. One of the changes was the Immigration Act of 1990, which lifted the restriction on the number of countries that can be admitted to the program (Siskin, 2014). See Table 4.1 for a chronology of major regulations and reforms pertaining to the VWP.

Citizens from non-VWP countries need to apply for a valid visa to enter the US, which involves among other things interviews in the consular offices abroad. In addition to an interview, consular officers are required to screen visa applications using the Consular Consolidated Database, Consular Lookout and Support System and TIPOFF database (a database containing a list of potential terrorists) to check the background of the applicants and their admissibility (Wasem, 2010; Siskin, 2014).

Except for the B-visa category, which is waived for citizens of the VWP eligible countries, foreigners from all countries not legally residing in the US, require a visa to enter the US. The INA provides the laws, regulations, policies, and criteria for eligibility of visa and entry to the US. Currently, the Department of State, the Department of Homeland Security (DHS), and the Department of Justice are the key US government bodies mandated with administering the laws and policies on the admission of foreigners to the country (Wasem, 2010).

After the 9/11 terrorist attacks on the US, the Enhanced Border Security and Visa Entry Reform Act of 2002 was signed into law and was aimed at strengthening border security against potential threats posed by inbound travellers. The law affected both VWP participating and non-participating countries. Some of the provisions of the law include increased visa processing fees, and longer processing times due to higher scrutiny

Table 4.1: **Major Reforms Regarding the VWP**

Year	Act	Description
1986	Immigration Reform and Control Act of 1986	Established the Visa Waiver Pilot Program
1999	Immigration Act of 1990	Further requirements for the program and removed the limit on the number of countries that could participate in the program
2000	Visa Waiver Permanent Program Act	The VWP signed into law
2002	Enhanced Border Security and Visa Entry Reform Act	The VWP members report the theft of blank passports, and required, prior to admission in the United States, that all aliens who enter under the VWP are checked against a lookout system
2008	Eight countries admitted to the VWP	Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Slovakia, and South Korea

Source: Siskin (2014)

for those who require valid visas to enter the US. The law also stipulated that federal law enforcement and intelligence agencies share data on admissibility and deportation of foreigners with the Immigration and Naturalization Service and have a full integration of database systems. Moreover, the law requires that all foreign nationals entering the US under the VWP present machine-readable, tamper-resistant passports with biometric information.[3] Regarding travellers to or from the US, commercial aircraft or vessels arriving at, or departing from, the US provide border officers with passenger and crew information.[4]

Whether the VWP exposes the US to security threats or not is an ongoing debate. The fact visitors from VWP participating countries bypass background screening at the US consular offices abroad led some to express concern that terrorists can use the opportunity to enter the US with ease (Siskin, 2014). The ESTA enhances security by screening travellers electronically before they embark on their travel to the US. However, there

[3]The initial deadline for machine-readable passport with biometric information was October 2005.

[4]See Neiman and Swagel (2009) for a review and an impact of the Enhanced Border Security and Visa Entry Reform Act of 2002 on inbound travel to the US.

is a concern that its name-based system is incompatible with biometric-based databases such as the DHS's Automated Biometric Identification System and the FBI's Integrated Automated Fingerprint Identification System.

On the other hand, proponents of the VWP such as the Heritage Foundation argue that by enhancing information sharing with partner countries any potential security threats are more likely to be curbed in advance.[5] Moreover, the stringent passport security standards required by VWP participants such as machine-readability of the passports are less likely to be forged. They also contend that the US can revoke the VWP status for any country if the security risk is deemed unacceptable and travellers violate US immigration laws (as was done for Argentina and Uruguay). Griswold (2007) argues that visa-free access to the pool of less security risk countries frees resources to be reallocated to consular offices in countries where security concerns are more likely to arise.

The Visa Waiver Program Office manages the compliance of the current VWP countries to rules and regulations and the processes of admitting new countries to the program. A report produced by the US Government Accountability Office (GAO) outlines the interim procedures the DHS uses to admit a new country to the VWP.[6] The Department of the Secretary of State (DSS) can nominate a country for the VWP after determining the country meets the essential criteria for visa exemption including a low refusal rate, reciprocal privilege for US citizens, the historical patterns of passport and visa abuses, the state of terrorism, and the potential impact on US national security of including the country in the program (see Box C.1 in the appendix for a detailed list of the entry criteria to the VWP). The DSS also ensures the statutory requirements of the VWP are met, and the country demonstrates the US law enforcement and security interests are not

[5] http://www.heritage.org/research/factsheets/the-visa-waiver-program-a-security-partnership, accessed on 6 July 2015.

[6] The report by GAO regarding admission procedures can be accessed from http://www.gao.gov/products/GAO-06-835R (Accessed on 25 June 2015).

compromised. Then, the DHS sends a team to a site visit of the candidate country to review the countrys political, social, and economic conditions, security of passports, the state of border control, and information related to its immigration and national security laws. Using the review from site visits and information from various other sources, the DHS, in consultation with the DSS, decides whether or not to admit a country. The US GAO reviews the procedures followed by the DHS in admitting a new country.

In 2005, the US government started providing countries aspiring to join the VWP with roadmaps to aid them in meeting the program criteria (Siskin, 2011). As of 2005 there were eighteen countries in the roadmap scheme, eight of which were admitted to the program in 2008.[7] As discussed in preceding sections, in 2008 when the eight countries were admitted the refusal rate criteria was temporarily relaxed (from October 2008 to November 2009). In November 2009, the criteria were reinstated and provide some of the hurdles for the admission of the roadmap countries into the VWP.

Four of the roadmap countries namely Bulgaria, Cyprus, Poland, and Romania are members of the European Union (EU). As documented in Wilson (2007) and Siskin (2011), the exclusion of some EU members from the VWP raises concerns, as EU laws require treatment of all EU members equally. The concern is exacerbated as the Schengen Area of which these four countries are members, does not require a visa for US citizens to visit for up to 90 days for tourism and business purposes. This raises obvious reciprocity issues. Poland is among the countries that have been critical of the delay to their inclusion into the VWP. However, its visa refusal rate has been over 3%. For example, in 2013 the refusal rate of Polish applicants for US visas was 10.8%. Hence, the INA will have to amend the criteria if the 'roadmap' countries are to be included in the VWP (Siskin, 2011, 2014).

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[7] Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Slovakia, and South Korea were admitted to the VWP in 2008; the ten countries still in the roadmap category are Argentina, Brazil, Bulgaria, Cyprus, Israel, Malaysia, Poland, Romania, Turkey, and Uruguay.

4.3 Empirical Literature Review

As noted in the previous chapter, the primary factors determining international cross-border travel and tourism identified in the literature includes income of origin countries; relative prices measured by price indices or exchange rates; and transportation costs (in some cases approximated by distance). See, for example, Crouch (1995), Lim (1999), Eilat and Einav (2004), Culiuc (2014), and the previous chapter of the this thesis for a review of the major determinants of these flows.

In this section, we focus on recent studies that explore the determinants of US inbound travel. Using a consumer's choice model between spending at home (Canada) and a foreign country (US), Vilasuso and Menz (1998) found the country of origin prices and exchange rates to be the main factors that influenced the choice of tourism spending in the US by Canadians for the period between 1980 and 1995. Similarly, Ekanayake et al. (2012) using panel cointegration methods for the period 1986 to 2011 found that the country of origin income, tourism-related prices, the cost of travel, and exchange rates significantly affected tourism demand. Bonham et al. (2006) argues prolonged visa process and difficulties associated with it as well as higher visa fees potentially contributed to the decline in US inbound travel after the 9/11 terrorist attack implying the decline was mainly from those that required visas. Visa application fees to the US sharply increased after 2001, but whether the price hike affected the decline in US inbound travel remains debatable (see, for example, Rose (2004)). Neiman and Swagel (2009) suggest that longer waiting times for visa processing and the extra inconvenience associated with increased security scrutiny on arrival are two factors that have accounted for the sharp decline in US inbound travel following the 9/11 terrorist attack from both VWP and non-VWP countries alike. Hence, the Neiman and Swagel (2009) finding implies that since the decline was observed from origins under the VWP and those that require visas to enter the US alike, the primary factor for the decline was the increased scrutiny of inbound travellers.

From various anecdotal sources, Goodrich (2002) asserts that the 9/11 attacks resulted in a significant increase in waiting times at airports, higher costs on the airline industry due to increased costs of enhanced security measures, such as strengthening aircraft cockpit doors, and surveillance monitors in aircraft. These led to significant layoffs in the airline industry and related sectors.

The Travel & Tourism Competitiveness Report of 2015 compiled by the World Economic Forum ranks the US at number five out of 141 countries included in the report. Despite a high competitiveness of the US in international tourism and its growing contribution to the economy, studies on the determinants of US inbound travel is very limited.[8]

Similarly, despite visa policies being the main institutional tools for controlling the cross-border flow of people, a systematic study of their quantitative impact is limited. The studies that incorporated a visa in the context of travel and tourism that we are aware of are Neiman and Swagel (2009), Neumayer (2006) , Neumayer (2010), and Li and Song (2013). Neumayer (2006) and Neumayer (2010) investigate the role of visas on the cross-border flow of people, and detect a detrimental impact of visa restrictions on travel. Li and Song (2013) find a significant economic loss in China due to visa restrictions introduced following the 1989 Tian'an Men Square Incident and the 2008 Beijing Olympic games.[9]

The US VWP aims to facilitate travel to the United States for tourism and business purposes without threatening its security. By providing visa-free access to citizens of

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[8] Brewton and Withiam (1998) argues that the decline of the US international tourism flow in the 1990s was primarily caused by lack of coherent federal travel policy. Moreover, he argues that a cut in government spending in the tourism sector as one of the reasons why the US was not a member of the United Nations World Tourism Organization (UNWTO). The US is not a member of the UNWTO currently.

[9] Two notable studies that address student visas are Jena and Reilly (2013) who examine the determinants of the demand for UK student visas, and Shih (2016) who investigate the role of H-1B visa (a non-immigrant visa that allows US companies to employ foreign workers) on incoming students to the US. Jena and Reilly (2013) find bilateral exchange rate to be a more important factor than GDP of the source country for demand for a student visa while visa costs are not statistically significant determinants. Shih (2016) finds that issuance of H-1B visa to a country significantly increases the number of international students from that country implying that flexible visa policies encourage inbound student mobility.

eligible countries, the program is intended to enhance tourism and commerce between the US and those countries, and boost airline revenues for US carriers. Moreover, the program helps the US to shift more resources to visa-issuing consular offices in high-risk countries (Wilson, 2007; Ford, 2010; Siskin, 2014).

4.4 Data and Descriptive Statistics

4.4.1 Data Sources and Definitions

Adopting the United Nations World Tourism Organization (UNWTO) definition of short-term travel, we measured annual sojourns in the US by the number of visitors - a concept that includes business, tourism, and other private visits from the rest of the world who stay from between one night up to a year. The travel data employed by the study are also derived from UNWTO (UNWTO, 2014).

We use the real exchange rate as a measure of relative prices between the country of origin and the US. We define and compute real exchange rate as the ratio of the official exchange rate to the Purchasing Power Parity (PPP) conversion factor for a given country of origin relative to the US following Rodrik (2008). Data on the official exchange rate, PPP conversion factors, and GDP in countries of origin came from the World Bank's World Development Indicators (World Bank, 2013). The population of countries of origin are derived from Centre d'Etudes Prospectives et d'Informations Internationales (CEPPI).[10] A description of primary variables of interest is shown in Table 4.2.

4.4.2 Treatment and Comparison Groups

Our main treatment group sample contains the eight countries added to the VWP in 2008. The different set of comparison groups against which we compare travel from the treated countries includes the ten 'roadmap' countries that are in the process of negotiating to

[10] Available at http://www.cepii.fr

Table 4.2: **Variable Definitions**

Name	Definition
LINBOUND	Log of inbound flows to the US consisting of travellers for tourism, business, and personal purposes
V	Treatment group: Takes a value of 1 if country is admitted to the VWP in 2008, zero otherwise
V*P2008	Treatment Indicator: Interaction between the treatment dummy (V)) and post-treatment period (2009-12)
LRGDP Per Capita	Log of Real GDP Per Capita (At year 2000 Prices) in country of origin
LEXCHANGERATE	Log of the ratio of the Official Exchange Rate to PPP conversion factor, defined in terms of the currency of country of origin per US Dollar
LPOPULATION	Log of population of country of origin

enter to the VWP, the rest of the world that are not currently in the VWP, and the rest of the world including the roadmap countries and countries admitted to the VWP prior to 2008. Thus, the last category of countries excludes only the countries accepted in 2008 (i.e. the treatment group).

The reason for choosing the 'roadmap' countries that are in the process of negotiations to enter the VWP is that they are deemed eligible to start the process to join the VWP by US authorities. Hence, comparing countries that joined the VWP and countries on the verge of joining attenuates potential dissimilarities between the treatment and control groups for the VWP given the VWP criteria. The other two sets of controls, namely, the rest of the world not currently included in the VWP, and the rest of the world including the roadmap countries but not admitted to the VWP prior to 2008 provide robustness checks in case factors peculiar to the 'roadmap' countries are driving the results.

Furthermore, we also restrict the treated and comparison groups only to European countries focusing on those with similar economic history, levels of economic performance, and institutional structures. Given that Europe's recovery from the great recession of 2007-2009 was slower, and some countries suffered a second crisis around 2011, focusing on a sub-sample of European countries helps overcome potential biases resulting from the financial crisis on cross-border travel to the US. The analysis with European treatment

Table 4.3: **Pre-Program Comparison of Treatment and Comparison Groups**

	Control (2008 Roadmap)	Treatment (2008 VWP)	Difference
	Mean	Mean	
LRGDP Per Capita	8.945*** (0.115)	9.404*** (0.077)	-0.459*** (0.146)
LEXCHANGE RATE	0.521*** (0.07)	0.4*** (0.02)	0.121 (0.082)
LPOPULATION	16.671*** (0.34)	15.258*** (0.35)	1.413*** (0.488)
LDISTW	9.0*** (0.077)	8.94*** (0.06)	0.13 (0.09)

Note
Data are average for the 2004 - 2007 period
T-test of group means , standard errors are reported in parenthesis

and comparison groups focuses on seven of the eight countries admitted to the VWP in 2008 and four of the 'roadmap' countries in the same year.

We provide a comparison of pre-treatment characteristics of the main treatment group (2008-VWP) and the main comparison group (2008 'roadmap' countries) based on observable characteristics in Table 4.3. The treatment group tends to be richer in terms of GDP per capita but smaller in population than the comparison group. This can have implications for external validity in terms the potential effect the VWP when rolled-out to include more heterogeneous countries. There is no difference regarding real exchange rate levels and distance to the US. Never the less, we acknowledge the potential threat to external validity associated with the statistical difference between the treatment and control groups with respect to GDP and Population. In the context of difference-in-difference estimation, the essential element that needs to be addressed is the existence of a parallel trend in travel levels to the US. This is the case in our models as is shown in forthcoming sections graphically and by formal testing.

The use of different sets of treatment and comparison groups helps ensure that our analysis is not driven by the characteristics of a certain group of countries. The lists of treatment and comparison groups for our analysis are provided in Tables C.2, C.3, and C.4 of the appendix.

The visa waiver programme applies to visits of up to 90 days while the dependent variable, namely, inbound travel to the US includes all visits of up to one year. This can potentially create inconsistency when comparing visitors that are eligible to the VWP and others who travel with visas who may stay longer than 90 days. However, for the period 2004-2012, the average length of stay in the US by travellers included in out data is about 17 days UNWTO (UNWTO, 2014). The UNWTO (UNWTO, 2014) data only provides the average stay of travellers and not the whole distribution of stay of travellers in the US. However, given that the average stay is only 17 days, we do not expect a significant number of travellers to stay more than 90 days. Hence, while in principle our travel measure includes all travellers who stay for less than a year, the number of individuals who stay for more than 90 days is likely to be vanishingly small and hence is not likely to significantly affect the conclusions of our study.

The summary statistics for the main variables of interest are given in Table 4.4, which contains mean values and their corresponding standard deviations for the different sets of treatment and comparison groups for 2004-12. A detailed set of summary statistics showing the between and within variation for the various sets of treatment and comparison groups is given in Tables C.5, C.6, C.7, and C.8 in the appendix.

Table 4.4: **Summary Statistics: Mean 2004-12**

Variable	Worldwide		Europe	
Treatment (V)	2008 VWP	2008 VWP	2008 VWP	2008 VWP in Europe
Comparison	2008 Roadmap	Non-VWP	Rest of the World	2008 Roadmap Europe
LINBOUND	10.677 (1.53)	8.956 (2.43)	9.414 (2.61)	9.886 (0.98)
V	0.471	0.055	0.047	0.636
V*P 2008	0.209	0.024	0.021	0.283
LRGDP Per Capita	9.17 (1.50)	7.76 (0.49)	8.15 (1.4)	9.2 (0.43)
LEXCHAGERATE	-0.448 (0.25)	-0.778 (0.38)	-0.658 (0.47)	-0.441 (0.21)
LPOPULATION	15.952 (1.59)	15.605 (2.05)	15.659 (2.00)	15.308 (1.30)
OBSERVATIONS	153	1318	1534	99

Note
Standard Deviations are reported in parenthesis for continuous variables only
The first three columns contain the countries admitted to the VWP in 2008 as treatment and the various groups as the comparison category. The fourth column restricts the treatment and comparison groups to Europe.

4.4.3 An Overview of Outbound Travel to the US

Comparing travel and tourism flows to the US from the newly admitted countries and other countries with similar socio-economic characteristics but not admitted to the VWP, can provide a portrait of the impact of visa waiver programs on cross-border travel. A visual inspection of inbound travel to the US from the treated and the comparison countries reveals a marked difference after 2008 (the year the treated countries were included into the VWP) as shown in Figures 4.1 and 4.2. In Figure 4.1, we compare travel to the US from the countries that entered into the VWP in 2008 with those in the 'roadmap' set in the same period. In Figure 4.2, we compare the travel to the US from the countries in Europe, which entered the VWP in 2008 with those European countries in the 'roadmap' group for the same period. Both Figures 4.1 and 4.2 reveal a decline in travel to the US from the 'roadmap' countries in 2008. This may be due to the global financial crisis although travel from the treated countries did not decline in the same year. The potential impact

of the VWP is most apparent and persistent when the treatment and comparison groups are restricted to Europe (Central and Eastern Europe) as shown in Figure 4.2, as both categories were likely to suffer from comparable economic shocks. Similar comparisons between various categories of treatment and comparison groups are shown in Figures C.2 and C.3 in the appendix. The figures show that travel from the treated countries tends to decline from around 2011 compared to the various comparison groups. One explanation is that seven of the treated countries are found in Europe, which was most affected by the financial crisis and where the recovery was slower (as shown in Figure 4.3). The recovery process in Europe was halted at the end of 2010 when the European economy started to slow down again in contrast to elsewhere.

A visual inspection of Figures 4.1 and 4.2 also indicates that before the treatment period, the treated and comparison group exhibit common parallel trends, which is an essential identification assumption for the estimation procedure subsequently deployed. We formally test this proposition in a subsequent section. However, a parallel trend in the case of Figure C.2 is less apparent. Possible explanations are either the existence of high heterogeneity or outliers in the comparison group.

The great recession of 2007 to 2009 saw output plunge in many countries especially those in the developed world. Travel and tourism flow declined over this period. Figure C.4 of the Appendix shows inbound tourism trends in four developed countries. The fall in travel and tourism inflows is evident in all four countries. However, the decline in inflows to the US was not only smaller but also more transient. One explanation for the faster recovery of the US travel inflows is the faster revival of the US economy. Another potential factor that may partly explain the difference in the figure is the accession of eight new countries into the VWP program, and the resultant increase of travellers from these countries to the US post-2008.

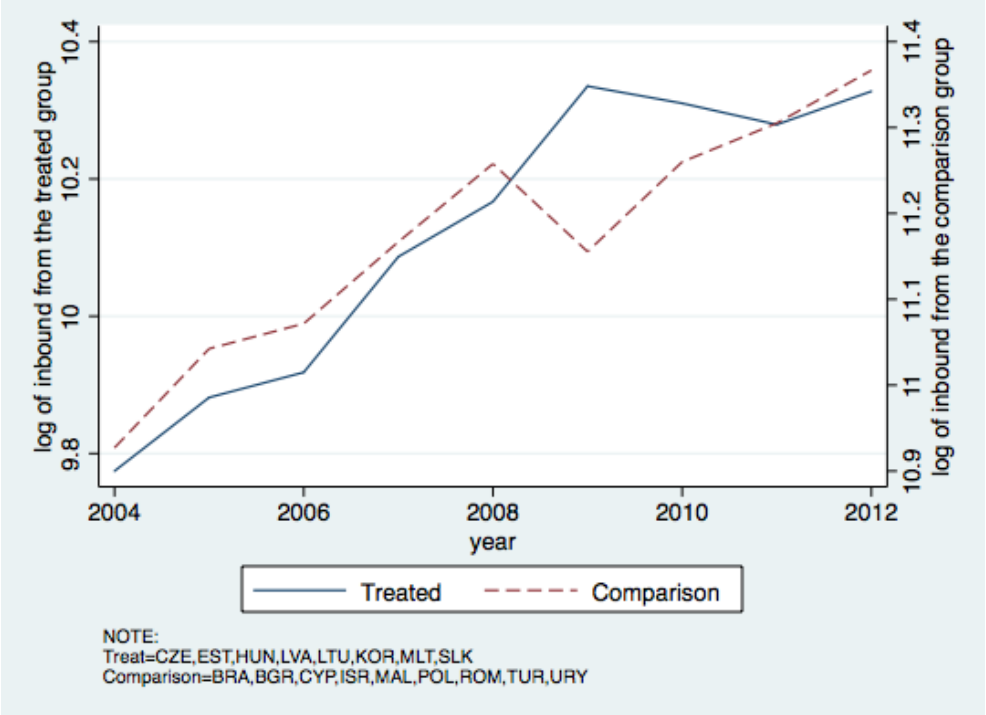

Figure 4.1: **Inbound Travel to the US from Treated (2008 VWP) and Comparison (2008 Roadmap) Groups**

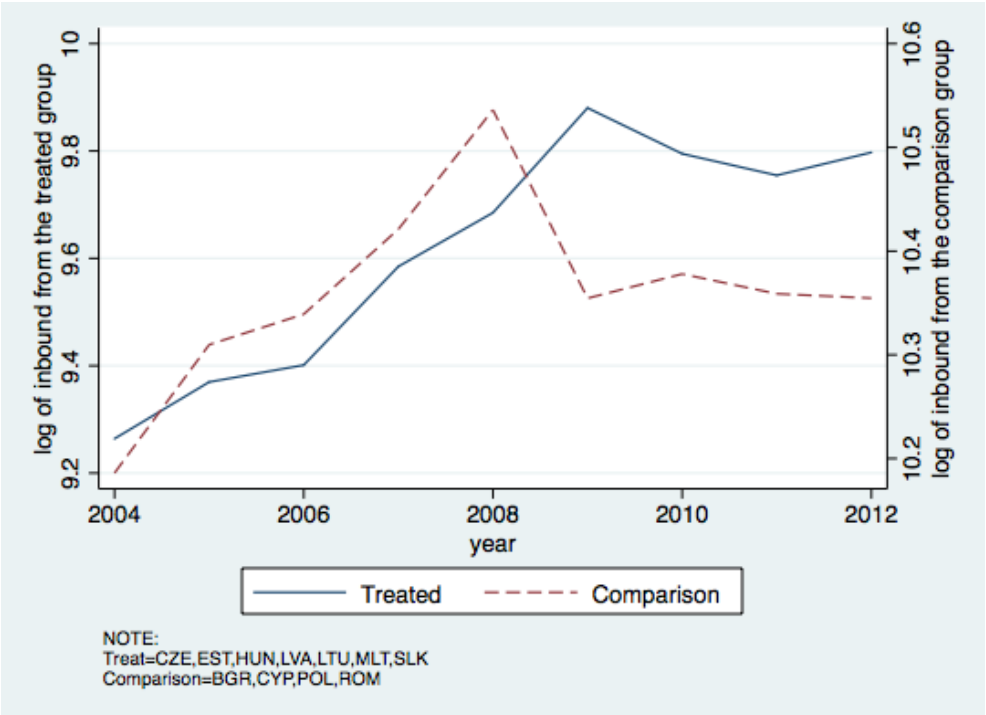

Figure 4.2: **Inbound Travel to the US from Treated (2008 Europe VWP) and Comparison (2008 Europe Roadmap) Groups**

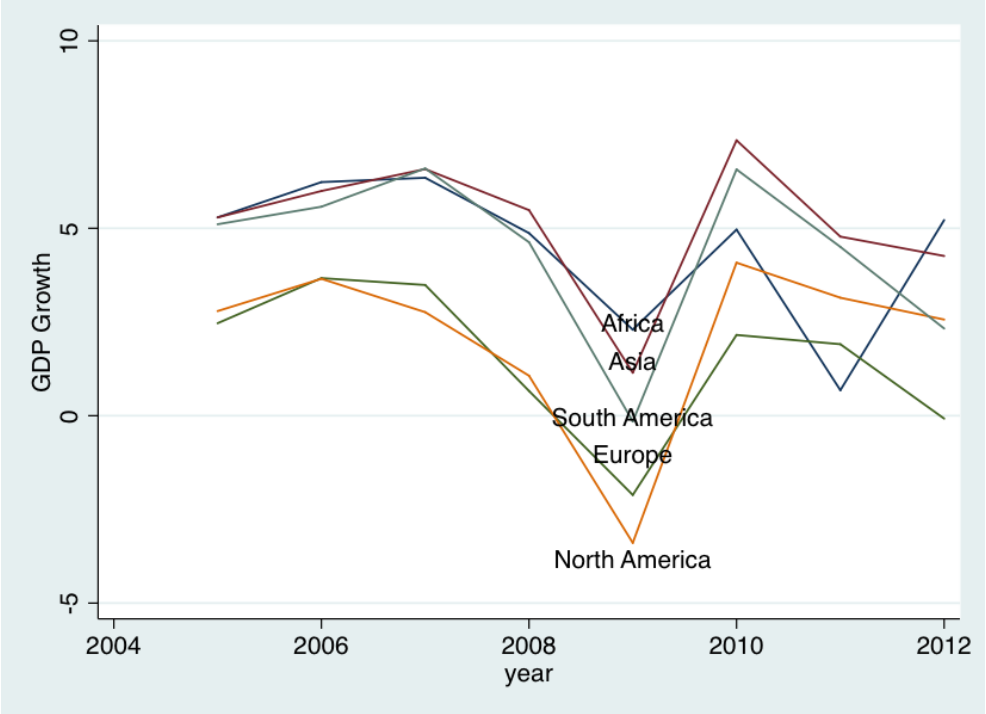

Figure 4.3: **Global Patterns of Economic Growth: 2004-12**

As a preliminary indicator of the role of admitting a country into the VWP, we compare travellers to the US from Hungary, a country admitted to the VWP in 2008 with travellers from Romania, which was in the roadmap category to join the VWP in the same year. Both are located in the same region and were centrally planned economies for much of the post-war period up to 1990. Moreover, both recently became members of the EU. The two countries had comparable travel levels to the US in the 2004 -08 period, with Romania having slightly higher levels compared to Hungary. In 2008, both countries were affected by the global financial crisis, which also affected travel levels to the US. However, Hungary was admitted to the US VWP in 2008. Despite the 2008 crisis, travel to the US from Hungary continued to rise while travel from Romania started to decline in 2008 as shown in Figure 4.4.

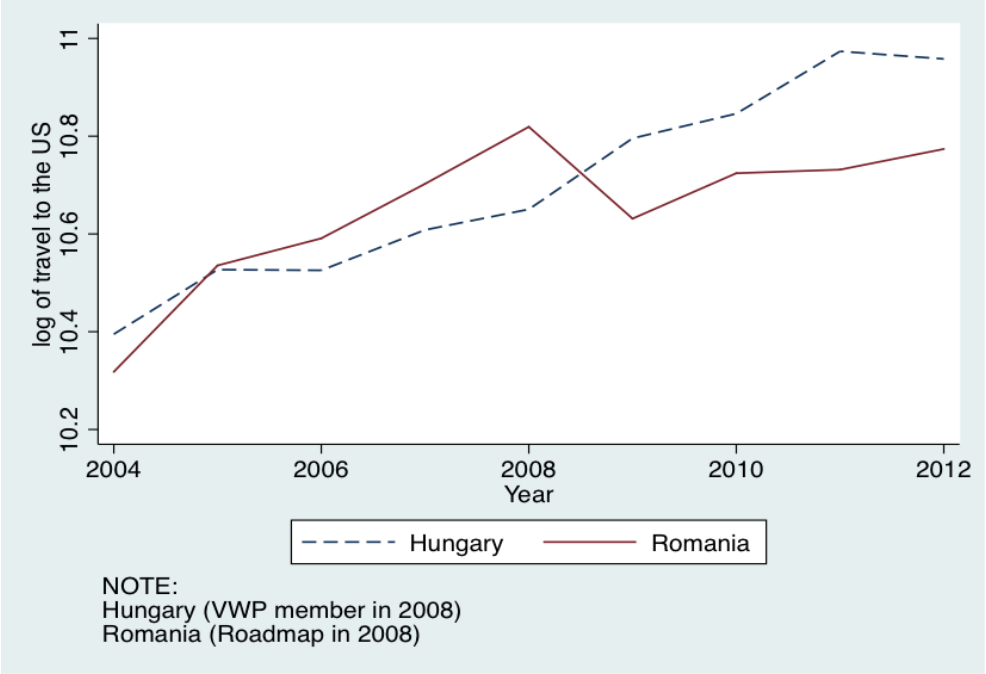

Figure 4.4: **Inbound Travel to the US from Selected Countries**

A more precise impact of admission to the VWP on travel to the US requires the use of econometric techniques, to which attention now turns.

4.5 Econometric Methods and Identification Strategy

We conduct panel data analysis of US inbound travel between 2004 and 2012 using standard Difference-in-Difference estimation procedures (see, for example, Bertrand et al. (2004)). Our model is specified as:

$$ln(T_i) = \rho_c + P_t + \beta(V_i * P_{i2008}) + \gamma' X_{it} + \varepsilon_{it} \tag{4.1}$$

where T_i is inbound travel to the USA in period t from country i. V_i is a dummy variable for whether country i has been admitted to the VWP in 2008 (treatment indicator). P_{i2008} a dummy variable for the post 2008 period. The parameters ρ_c and P_t capture origin country fixed effects and time dummies respectively, X_{it} is a vector of covariates. β captures the average effect of the accession to the WVP in terms of US inbound travel.[11]

[11] Since we use panel data fixed effect estimator V_i does not appear in (4.1) on its own

For a year-by-year effect of the program after its implementation, we include year dummies for 2009, 2010, 2011, and 2012 interacted with the treatment indicator. In other words we include 'year leads' interacted with the treatment indicator. Hence, we estimate

$$ln(T_i) = \rho_c + P_t + \sum_{t=2009}^{2012} \alpha'(V_i * P_{it}) + \lambda' X_{it} + \xi_{it} \tag{4.2}$$

where α' is a vector capturing the effect of the program in year 1 (2009), year 2 (2010), year 3 (2011), and year 4 (2012). Both ρ_c and P_t are defined as in Equation (4.1).

A fundamental assumption of the Difference-in-Difference method is the presence of parallel trends between treatment and comparison groups, which implies that in the absence of the program intervention the difference between the treated and comparison group is constant. To test this, we extend Equation (4.1) to include trend and treatment interactions with all the periods, essentially not limiting the program period to just 2008. Hence, we are creating placebo programs in all years. In addition to the '*year leads*' introduced in Equation (4.2), we also include '*year lags*'. If the assumption of parallel trends holds for the treated and comparison groups for the period before 2008, the estimates corresponding to the interaction of the treatment group with the '*year lags*' should be statistically insignificant. The regression for checking the parallel trends assumption is specified as:

$$ln(T_i) = \rho_c + P_t + \sum_{t=2004}^{2008} \kappa'(V_i * P_{it}) + \sum_{t=2009}^{2012} \theta'(V_i * P_{it}) + \delta' X_{it} + \zeta_{it} \tag{4.3}$$

where the parameters and variables are defined as in (4.1) and (4.2). The null hypothesis of similar trend is $\kappa' = 0$

As Moulton (1990) shows in regressions with a mixture of individuals and grouped data, such as in Differences-in-Differences where individual country outcomes are regressed on policies that apply to groups, standard errors can be downward biased. Moreover Bertrand et al. (2004) argue that most Differences-in-Differences estimations, particularly those with

an extended period, yield biased standard errors due to high serial correlations. Test of serial correlation for linear panel data model due to Wooldridge (2002) strongly reject the null of no serial correlation. To mitigate these issues, we estimate our models based on robust standard errors clustered at origin country level. Besides, we also report one of Bertrand et al. (2004)'s proposed solutions, which is to ignore the time series information. We average the data before and after the program periods and run Equation (4.1) on a panel of length two.

4.6 Results and Discussion

4.6.1 Main Results

The main regression results for the Difference -in-Difference models are reported in Tables 4.5 and 4.6. The results indicate a marked increase in inbound travel to the US from countries admitted to the VWP in 2008 compared to an otherwise similar set of countries and a comparison group comprised of the rest of the world.

In columns 1-3 of Tables 4.5 and 4.6 the treatment group consists of the eight countries admitted to the VWP in 2008. In column 4 of the tables, the treated and comparison groups are restricted to Europe.[12]

Table 4.5 reports the impact of the VWP by comparing pre and post 2008 inbound travel. The primary variable of interest (V*POST2008) captures the role of the VWP. The estimates for these key variables using the different sets of controls are significant at conventional levels. The magnitudes can be interpreted as follows. Focusing on columns 1-3, on average, *ceteris paribus*, a country admitted to the VWP in 2008 exhibited an increase in travel to the US of 40% compared to a typical 'roadmap' country; 36% more compared to the rest of the world, not in the VWP; and 29% more compared to the rest

[12] As indicated in preceding sections, the complete list of treated and comparison groups is given in Table C of the appendix.

Table 4.5: **Determinants of Inbound Travel (2004-2012): Diff-in-Diff Estimation - Pre and Post Admission**

VARIABLES	**WORLDWIDE**			**EUROPE**
TREATMENT (V)	2008 VWP	2008 VWP	2008 VWP	2008 VWP
COMPARISON	2008 ROADMAP	NON-VWP	REST OF THE WORLD	2008 EUROPE ROADMAP
DEP. VARIABLE	Linbound (1)	Linbound (2)	Linbound (3)	Linbound (4)
V*POST2008	0.338**	0.311***	0.253**	0.364*
	(0.128)	(0.103)	(0.102)	(0.191)
LRGDP Per Capita	0.244	0.771***	0.621***	0.267
	(0.663)	(0.212)	(0.194)	(0.958)
LEXCHANGE RATE	-0.974**	-0.430***	-0.365***	-0.614
	(0.373)	(0.139)	(0.132)	(0.566)
LPOPULATION	1.197	1.243***	1.022***	1.686
	(1.72)	(0.269)	(0.287)	(2.916)
YEAR_FIXED_EFF	Yes	Yes	Yes	Yes
OBSERVATIONS	153	1318	1534	99
R-SQUARED (within)	0.557	0.373	0.379	0.490
SIGMA	0.834	1.844	1.654	1.261
SIGMA_E	0.188	0.259	0.246	0.206

Note
Clustered Robust Standard errors in parentheses. SIGMA and SIGMA_E indicate standard deviations of residuals within groups (panel level) and that of overall error term respectively
***, **, * indicate Significance at 1%, 5%, 10% level

of the world including countries admitted to the VWP prior to 2008.

In column 4, we restrict the treatment and comparison groups to Europe. This helps to effectively control for the potential heterogeneity of countries in terms of unobserved socio-economic characteristics that may potentially bias the estimates. Since seven out of the eight countries admitted to the VWP in 2008 are in Europe, restricting both treatment and comparison groups to Europe is a worthwhile exercise to control for an observed characteristic that may drive the results.

Again the results in column 4 suggest very similar quantitative effects of the VWP to columns 1-3. In percentage terms, on average and *ceteris paribus*, a European country admitted to the VWP in 2008 saw an increase in travel to the US by 44% compared to a typical European country in the roadmap group.

We now briefly turn to the other estimates. The elasticity of origin income travel to the US is about 0.6 - 0.8 (see columns 2 and 3). This is similar to estimates provided in Culiuc (2014) and Neumayer (2010), while slightly lower than the findings of other studies

reporting an elasticity of close to one or slightly above one such as Eilat and Einav (2004).[13] Income is not a significant determinant of inbound travel to the US in the columns 1 and 4 perhaps due to the similarity in GDP levels among the treated and comparison groups in those columns.[14]

The real exchange rate is negatively related to travel to the US as expected and in line with findings in related research on the role of costs associated with travel. A higher exchange reflects higher relative prices of goods and services in the USA compared to countries of origin of travellers. The size of a country, measured by its population, does not yield a significant effect on travel travel to the US.

The year-by-year effects of admission to the VWP on travel are reported in Table 4.6. Columns 1-3 of Table 4.6 compare the 2008 VWP countries with the same comparison groups worldwide as in Table 4.5. The results show that the effect was positive in the two years after the program. The effect after the two years depends on the specifications (the type of treated and comparison groups). Hence, our results point to a modest persistent effect of the program.

Our results suggest that less restrictive visa policies enhance the number of potential visitors due to reduced uncertainty, inconvenience, and costs associated with a visa application. Corroboration can be obtained from other studies already cited in the literature review, which found that restrictive visa policies had a detrimental effect on travel (for example, see Neumayer (2006), Neumayer (2010). Neumayer (2010) finds that restrictive visa policies reduce travel by between 52% and 63% depending on the specification. This is not directly comparable to our estimates as it deals with restrictions rather than relaxation of visa policy. However, the sizable magnitude of the effect is resonant of the effect

[13] Using T-tests, we find that difference between the elasticity of travel to origin income from our model are not different from the ones obtained by Culiuc (2014) and Neumayer (2010) respectively at conventional significance levels. The t-values are 1.16 and 0.56 respectively.

[14] A similar estimation as (4.5) using real GDP per capita instead of real GDP (not reported) reveals similar coefficients for the program effect.

Table 4.6: **Determinants of Inbound Travel (2004-2012): Diff-in-Diff Estimation - Year-by-Year Effect**

VARIABLES	**WORLDWIDE**	**WORLDWIDE**		**EUROPE**
TREATMENT (V)	2008 VWP	2008 VWP	2008 VWP	2008 VWP EUROPE
COMPARISON	2008 ROADMAP	NON-VWP	REST OF THE WORLD	2008 EUROPE ROADMAP
DEP. VARIABLE	Linbound	Linbound	Linbound	Linbound
	(1)	(2)	(3)	(4)
V*P2009	0.399***	0.377***	0.337***	0.436**
	(0.122)	(0.094)	(0.092)	(0.159)
V*P2010	0.357***	0.308***	0.253***	0.344*
	(0.120)	(0.075)	(0.072)	(0.170)
V*P2011	0.292	0.268*	0.201	0.325
	(0.171)	(0.156)	(0.155)	(0.235)
V*P2012	0.284	0.287*	0.218	0.362
	(0.178)	(0.172)	(0.171)	(0.245)
LRGDP Per Capita	0.258	0.772***	0.623***	0.301
	(0.665)	(0.212)	(0.194)	(0.953)
LEXCHANGE RATE	-0.954**	-0.426***	-0.361***	-0.592
	(0.378)	(0.140)	(0.133)	(0.559)
LPOPULATION	1.096	1.236***	1.014***	1.646
	(1.639)	(0.269)	(0.289)	(2.197)
YEAR_FIXED_EFF	Yes	Yes	Yes	Yes
OBSERVATIONS	153	1318	1534	99
R-SQUARED (within)	0.561	0.374	0.380	0.493
SIGMA	0.750	1.836	1.648	1.204
SIGMA_E	0.190	0.259	0.246	0.210

Note
Clustered Robust Standard errors in parentheses. SIGMA and SIGMA_E indicate standard deviations of residuals within groups (panel level) and that of overall error term respectively
***, **, * indicate Significance at 1%, 5%, 10% level

reported in this chapter in Table 4.5. Similarly, Li and Song (2013) also find a significant economic loss in China due to visa restrictions introduced following the student demonstrations in 1989 Tian'an Men Square and the 2008 Beijing Olympic games. For example, they find that visa restrictions reduced potential visitors to China during the 2008 Beijing Olympic games by 270.381 thousand and tourism receipts by $294.185 million.

As shown in the previous chapter, restrictive visa policies are also associated with lower tourism related revenues and employment. Conversely, the VWP program investigated here is thus potentially associated with higher tourism related revenues and employment.

4.6.2 Sensitivity Checks

To test for parallel trends between the treatment and comparison groups for the pre program period, we estimate Equation (4.3). The results are reported in Table 4.7. The estimates suggest that we cannot reject the null of similar trends between the comparison and the treated groups for 2004-2008 (pre-program period). Both the individual t-tests and the joint F-tests (shown at the bottom of Table 4.7) are statistically insignificant.[15] This provides a sound basis for the identification strategy used in this chapter.

Following Bertrand et al. (2004), we re-estimate Equation (4.1) by averaging the data pre and post the program periods using a panel of length two. Regression results based on this exercises are reported in Table C.9 in the appendix . The results are consistent with our main findings.

[15]Due to unavailability of data on real exchange rate Argentina, one of the ten-roadmap countries in 2008, was dropped from our main analysis. We ran regressions similar to Tables 4.5 and 4.6 without the real exchange rate to include Argentina (not shown here). The results remain robust.

Table 4.7: **Determinants of Inbound Travel (2004-2012): Diff-in-Diff Estimation - Test of Parallel Trends**

VARIABLES	**WORLDWIDE**			**EUROPE**
TREATMENT (V)	2008 VWP	2008 VWP	2008 VWP	2008 VWP (EUROPE)
COMPARISON	2008 ROADMAP	NON-VWP	REST OF THE WORLD	2008 EUROPE ROADMAP
DEP. VARIABLE	Linbound	Linbound	Linbound	Linbound
	(1)	(2)	(3)	(4)
V*P2005	0.060	-0.004	-0.009	0.017
	(0.042)	(0.031)	(0.029)	(0.053)
V*P2006	0.086	0.009	-0.002	0.024
	(0.082)	(0.050)	(0.049)	(0.095)
V*P2007	0.153	0.056	0.041	0.115
	(0.094)	(0.052)	(0.053)	(0.116)
V*P2008	0.195	0.125*	0.083	0.101
	(0.125)	(0.071)	(0.071)	(0.133)
V*P2009	0.499***	0.415***	0.360***	0.486**
	(0.165)	(0.122)	(0.120)	(0.196)
V*P2010	0.462**	0.346***	0.277***	0.394*
	(0.162)	(0.103)	(0.101)	(0.202)
V*P2011	0.399*	0.306*	0.224	0.376
	(0.197)	(0.177)	(0.177)	(0.261)
V*P2012	0.394*	0.326*	0.241	0.413
	(0.203)	(0.193)	(0.192)	(0.276)
LRGDP Per Capita	0.187	0.770***	0.622***	0.290
	(0.679)	(0.212)	(0.194)	(0.998)
LEXCHANGE RATE	-0.999**	-0.426***	-0.360***	-0.609
	(0.392)	(0.140)	(0.133)	(0.570)
LPOPULATION	1.258	1.253***	1.024***	1.668
	(1.748)	(0.269)	(0.289)	(3.022)
YEAR_FIXED_EFF	Yes	Yes	Yes	Yes
OBSERVATIONS	153	1318	1534	99
R-SQUARED (within)	0.570	0.374	0.380	0.497
SIGMA	0.901	1.855	1.656	1.227
SIGMA_E	0.191	0.259	0.246	0.215
F-TEST FOR PAR. TREND	1.64	0.92	1.78	0.45
	(0.213)	(0.45)	(0.20)	(0.775)

Note
Clustered Robust Standard errors in parentheses. SIGMA and SIGMA_E indicate standard deviations of residuals within groups (panel level) and that of overall error term respectively
***, **, * indicate Significance at 1%, 5%, 10% level

4.7 Conclusions and Recommendations

This chapter has investigated the impact of the US VWP on cross-border travel. The US has benefited in terms of boosting inbound travel from its VWP. Our analysis reveals that visa exemptions greatly enhance travel. Using a Difference-in-Difference procedure with panel data, we find that, *ceteris paribus*, admitting a country into the VWP increases inbound travel from that country to the US by about 40%. With regards to the persistence of the program, its effect in the first two years of the program is positive in all specifications. The effect after two years, however, depends on the specification (the treated and comparison groups). Hence, our results suggest a mildly persistent effect of the program over time.

A notable peculiarity of the treated and comparison groups in the current analysis is that the treated groups are, on average smaller in terms of population size. This can potentially affect whether the program will have a similar effect if rolled out to other countries. For example, the average population of the eight countries admitted into the VWP in 2008 was 10 million while that of the roadmap countries was 40 million in the same year. Comparing the population size of the treated with the other comparison groups also indicates a similarly significant disparity. However, population size is not a significant predictor of inbound travel the US according to our results. Hence, the population size of future entrants to the VWP program may not have a significant role in terms of the program effect. However, other factors that can affect the impact of rolling out the program to cover new entrants include the current visa acceptance rate, income of the countries of origin, and the nature of the bilateral foreign relation between the US and the aspirant country among others.

A caveat of this study is that it focused on the role of the VWP on enhancing travel, but does not consider any potential risks or benefits of the program concerning security. While anecdotal evidence from previous studies suggests that the VWP has also increased

US security due to information sharing with VWP countries and freeing of resources to consular offices in more risky countries, a more comprehensive evaluation of the VWP along the security dimension is clearly required. This is especially relevant as the US Congress is currently considering reforms to the VWP in the wake of the November 2015 Paris Terrorist attacks. The reform notably proposes screening of passengers entering under the VWP based on any past travel to a country known as a terrorist sanctuary. [16]

[16] See USA Today's report on the reform being considered at http://www.usatoday.com/story/news/politics/2015/11/30/us-tightens-visa-waiver-program-response-paris-terror-attacks/76564038/

Chapter 5

Conclusion

The thesis consists of three self-contained empirical papers. It examines the impact of institutions and cross-border policies on socio-economic outcomes. Each paper addresses a particular institutional aspect or policy and examines its impact on a particular socio-economic outcome. Focusing on specific institutions and policies helps understand the mechanism through which they matter for economic performance.

In line with North (1989), Acemoglu et al. (2000), Acemoglu et al. (2002), Hall and Jones (1999), and Rodrik et al. (2004), the thesis finds a significant role of institutions and policies on socio-economic outcomes. In comport with Acemoglu et al. (2005a), Rodrik (2005), and Bardhan (2005), unbundling the various types of institutions helps to better understand the mechanisms through which institutions and policies matter for socio-economic outcomes.

Using rich survey data from rural Ethiopia, the second chapter of this thesis finds evidence for distinctive determinants of overall life satisfaction and momentary happiness. Broader socio-economic factors such as consumption, religiosity, trust and political governance strongly predict life satisfaction, while primarily the economic situation drives momentary happiness. In line with Azzi and Ehrenberg (1975) individuals take after-life utility into account when evaluating their overall well-being as reflected in religiosity being a predictor of life satisfaction but not momentary happiness. The differential impact of in-

stitutions on life satisfaction and momentary happiness is in comport with the proposition of Deaton (2008) and Stevenson and Wolfers (2008) that life satisfaction and happiness are not synonymous, as assumed by several studies of well-being in the economics literature. Hence, a key lesson from this study is that separately addressing the various measures of subjective well-being helps to understand better the factors at play.

Like any other cross-sectional analysis, a limitation of the first chapter is the inability to control adequately for unobserved individual heterogeneity such as personality that can be particularly relevant in the SWB research. However, the Ethiopian Rural Household Survey has religion information only in the 2004 round and hence does not permit panel data analysis for the current research. Future research can investigate the determinants of SWB in rural areas using panel data methods as data becomes available for subsequent years.

Chapters Three and Four focus on the impact of more formal cross-border institutional regulations, namely visa policies on cross-border travel and associated benefits. Despite visa policies being the main institutional tools for countries to control cross-border flow of people, research on the extent of the impact of such policies on travel, and related employment and revenues is scarce. In Chapter three, we find a significant negative impact of restrictive visa policies on cross-border travel and associated income and jobs in destinations countries using cross-country data. Conversely, in Chapter Four, we find a significant positive role of the USA visa waiver program on inbound travel to the USA. A key lesson from the two chapters is that by flexing bilateral visa policies, countries can benefit from increased travel in the form of revenue and employment.

Potential extensions of chapters three and four include investigating the role of visa policy on cross-border travel and associated technology transfer, FDI, and trade among others. The role of visa policy on technology transfer is perhaps better studied when disaggregated data on travel by purpose is available as business travellers are likely to

play a greater role in technology transfer than tourists. The role of visa policies on FDI and trade is likely to be mediated through its effect on travel. Since the determinants of travel, FDI and trade are likely to be similar, identification becomes difficult. However, with a proper instrument for any of the variables of interest (i.e. travel, FDI, and trade), the impact of visa policies can be explored.

Moreover, future research can look at the role of the VWP on US security especially in light of VWP reform being considered by the US Congress in the wake of the November 2015 Paris Terrorist attacks. Other related extensions of the current study include examining the role of the VWP in improving trade and FDI flows between the US and its partners. Moreover, a similar study of the role of related visa policies on travel and tourism in other countries can boost our understanding of the role of visa policies and its determinants.

We have attempted to overcome endogeneity in Chapters Three and Four, but we can not fully claim that our findings reflect pure causality. Our results highlight significant effects of formal and informal institutions and policies on socio-economic outcomes and point to the need to do further research by unbundling institutions and policies and investigate their roles on specific socio-economic issues.

This thesis has dealt with cross-cutting issues from economics, political economy, psychology, and sociology and highlights the need for more multi-disciplinary research in development studies. In light of the increasing availability of data in the various disciplines in social science coupled with enhanced computing power, and recent advances in research methods, rigorous multi-disciplines research has become feasible.

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Appendix A

Chapter 2 Appendix

A.1 Chapter 2 Appendix Tables

Table A.1: **Religiosity Across Selected Countries**

How often do you attend religious services (%)				
	Colombia	Ethiopia	Egypt	United States
More than once a week	10.8	37.3	31	11.3
Once a week	34.5	39.9	24.6	23.2
Once a month	18.8	9.7	3.8	12.3
Only holy days	7.6	4.1	11	8.5
Once a year	5.9	0.3	0.6	4.4
Less often	10.7	6.1	9.4	11.5
Never	11.2	2.6	19.5	24.5
Missing; Not asked by the interviewer	0	0	0	3.5
No answer	0	0	0.1	0.8
Dont know	0.5	0	0	0
Observations (Number)	3,025	1,500	3,051	1,249

Source
World Values Survey Wave 5: 2005-2009, available at www.worldvaluessurvey.org

Table A.2: **Aversion to Divorce Across Selected Countries**

Justifiable: divorce				
	Colombia	Ethiopia	Egypt	United States
Never justifiable	37.2	54.9	28.5	5.4
2	4	15.3	2	3.5
3	3	2.8	3.7	5.8
4	3.5	1.2	4.7	5.3
5	12.9	6.9	16.5	31.9
6	5.8	2.1	8	7.9
7	5.5	1.5	10.7	8.7
8	7.5	1.7	10.9	9.2
9	5	1.3	5.8	3.9
Always justifiable	15.2	9.7	8.8	11.6
Missing; Not asked by the interviewer	0	0	0	3.7
No answer	0	1.1	0.2	3.2
Dont know	0.4	1.5	0.1	0
Observations (Number)	3025	1500	3051	1249

Source
World Values Survey Wave 5: 2005-2009, available at www.worldvaluessurvey.org

Table A.3: **District/Woreda Level Socio-Economic Characteristics**

District	Villages	Region	Major Religion	Satisfaction	Happiness	Trust	POLITICAL_TRUST	Religiosity	Main Crops
Atsbi	Haresaw	Tigray	Orthodox	1.09 (0.79)	0.88(0.75)	5.09	4.84	11.27	Cereals/Food
Subha-ssahssie	Geblen	Tigray	Orthodox	0.86(0.76)	0.76(0.66)	4.68	4.5	6.94	Cereals/Food
Ankober	Dinki	Amhara	Mixed	1.22(0.73)	0.92(0.64)	5.15	4.05	5.15	Cereals/Food
Bassona Worana	Debre Berhan	Amhara	Orthodox	1.31(0.63)	0.99(0.63)	4.92	4.52	3.72	Cereals/Food
Enemay	Yetmen	Amhara	Orthodox	1.04(0.63)	0.67(0.59)	4.33	4.18	6.27	Cereals/Food
Bugna	Shumsheha	Amhara	Orthodox	0.79(0.66)	0.57(0.63)	4.19	4.42	10.2	Cereals/Food
Adaa	Sirbana Goditi	Oromia	Orthodox	0.89(0.83)	0.84(0.68)	3.73	3.98	2.11	Cereals/Food
Kersa / Alemaya	Adele Kere	Oromia	Muslim	1.03(0.78)	1.1(0.64)	4.17	3.4	10.6	Cash crops
Dodota	Koro Degaga	Oromia	Muslim	0.67(0.73)	0.5(0.54)	3.72	4.18	5.94	Cereals/Food
Shashemene	Tirurfe	Oromia	Mixed	0.94(0.75)	0.79(0.65)	3.89	4.33	4.14	Cash crops
Cheha	Imdibir	SNNP	Mixed	0.87(0.66)	0.4(0.50)	3.54	2.67	6.42	Cash crops
Kedida Gamela	Aze Deboa	SNNP	Protestant	1.03(0.73)	1.06(0.58)	3.49	3.48	5.52	Cash crops
Bule	Adado	SNNP	Protestant	0.65(0.57)	0.56(0.60)	4.73	4.28	6.43	Cash crops
Boloso Sorie	Gara Godo	SNNP	Mixed	0.82(0.74)	0.82(0.54)	4.57	4.68	6.01	Cash crops
Daramalo/Gardula	Doma	SNNP	Protestant	0.56(0.66)	0.6(0.63)	4.73	4.58	5.31	Cash crops
Overall				0.93(0.73)	0.77(0.65)	4.33	4.14	6.39	-

Note
Data on main crop column is obtained from Dercon and Hoddinott (2011)
Remaining data are authors' computations from the ERHS

Table A.4: **Ordered Probit Estimation with Consumption Quantiles**

DEP.VAR	Satisfaction	Happiness
CONSTANT	-2.31***	-0.98*
Welfare Metrics		
LRCONSUMPTION_PC	0.49***	0.21*
LLIVESTOCK	0.52***	0.49***
Institutions		
TRUST	0.11***	0.05**
POLITICAL_TRUST	0.07***	0.04
PARTICIPATION	0.22**	0.01
Religion and Religiosity		
RELIGIOSITY	0.00	0.00
CATHOLIC	-0.14	0.30
MUSLIM	-0.34**	-0.13
PROTESTANT	-0.15	0.02
CATHOLIC*RELIGIOSITY	-0.00	-0.02
MUSLIM*RELIGIOSITY	0.02*	0.00
PROTESTANT*RELIGIOSITY	0.04**	0.03*
Relative Income (Consumption) Quartile		
QUARTILE_2	0.03	0.03
QUARTILE_3	-0.19	-0.05
QUARTILE_4	-0.49**	-0.06
VILLAGE CONTROLS	Yes	Yes
Mu(1)	1.49***	1.81***
OBSERVATIONS	1112	1112
pseudo R-sq	0.139	0.131

Table A.5: **Robustness of Variables of Interest to Inclusion of Controls**

DEP.VARIABLE	Satisfaction					
	(1)	(2)	(3)	(4)	(5)	(6)
CONSTANT	-0.67***	0.58***	0.70***	0.23**	-0.01	-1.55***
LRCONSUMPTION_PC	0.28***					0.20***
RELIGIOSITY		0.01**	-0.01			-0.00
CATHOLIC		-0.43***	-0.58***			-0.20
MUSLIM		-0.25***	-0.49***			-0.22*
PROTESTANT		-0.32***	-0.48***			-0.26*
CATHOLIC*RELIGIOSITY			0.03			0.03
MUSLIM*RELIGIOSITY			0.04***			0.03***
PROTSTNT*RELIGIOSITY			0.03			0.04**
POLITICAL_TRUST				0.07***		0.04**
TRSUT					0.12***	0.12***
LLIVSTIK						0.45***
LAND_PC						0.03
SINGLE						-0.27
WIDOWED						-0.40***
DIVORCED						-0.14
PARTICIPATION						0.20**
ILLNESS						-0.28***
VILLAGE_CONTROL	No	No	No	No	No	No
MU(1)	1.26***	1.24***	1.25***	1.24***	1.25***	1.41***
N	1114	1114	1114	1114	1114	1114
pseudo R-sq	0.019	0.011	0.017	0.005	0.016	0.103

Note

Note: control variables not reported include land holding size, education, gender, age, number of younger and older children

***, **, * indicate Significance at 1%, 5%, 10% level

A.2 Chapter 2 Appendix Figures

Adopted from Dercon and Hoddinott (2011)

Figure A.1: **Map of the ERHS Survey Area**

A.3 Derivation of the Heteroscedasticity Test

The Heteroscedasticity test used in this chapter are Adopted from Machin and Stewart (1990).

In ordered probit models residuals can not readily be estimated as they are not directly observed from $y_i^* - x_i'\beta$ due to the latent dependent variable, y_i^* , being not directly estimated. However, we do have y_i^* distribution conditional on x_i estimated by maximum likelihood method from which we can obtain the generalised residuals, $\hat{u}_i$, in accordance with Gourieroux et al. (1987).

$$\hat{u}_i^{(1)} = E(y_i^* - x_i'\beta | y_i = j, x_i) = \frac{\phi(\theta_{j-1} - x_i'\beta) - \phi(\theta_j - x_i'\beta)}{\Phi(\theta_j - x_i'\beta) - \phi(\theta_{j-1} - x_i'\beta)} \tag{A.1}$$

Where $\phi(.)$ and $\Phi(.)$ represent the standard normal PDF and the CDF operators for standard normal respectively. The $\hat{u}_i$'s are score contributions of the constant term (β_0). Multiplying the remaining elements of β with x_i yields their respective score contributions.

The threshold score contributions are given by

$$\eta_{ij} = \begin{cases} \frac{\phi(\theta_j - x_i'\beta)}{\Phi(\theta_j - x_i'\beta) - \Phi(\theta_{j-1} - x_i'\beta)} & if y_i = j \\ \frac{-\phi(\theta_j - x_i'\beta)}{\Phi(\theta_{j+1} - x_i'\beta) - \Phi(\theta_j - x_i'\beta)} & if y_i = j+1 \\ 0 & otherwise \end{cases} \tag{A.2}$$

For $j = 2, , J-1$

Higher-order moments residuals for testing higher ordered adequacy of the model are derived from a higher-order conditional moments specified in accordance with Stewart (1983) as cited in Machin and Stewart (1990) as

$$M_{\tau i} = \frac{W_{(j-1)i}^r \phi(\theta_{j-1} - x_i'\beta) - W_{ji}^r \phi(\theta_j - x_i'\beta)}{\Phi(\theta_j - x_i'\beta) - \Phi(\theta_{j-1} - x_i'\beta)} \tag{A.3}$$

The first four moments residuals of Chesher and Irish (1987) and the conditional

moments can then be related as

$$\hat{u}_i^{(1)} = \hat{M}_{01}$$

$$\hat{u}_i^{(2)} = \hat{M}_{1i}$$

$$\hat{u}_i^{(3)} = 2\hat{u}_i^{(1)} + \hat{M}_{2i}$$

$$\hat{u}_i^{(4)} = 3\hat{u}_i^{(2)} + \hat{M}_{3i}$$

We run tests for heteroscedasticity using test statistics that take the following general form

$$\xi = 1'Z(Z'Z)^{-1}Z'1 \tag{A.4}$$

Where 1 is an n-dimensional vector of ones and Z is a matrix with row order n . Each row contains the score contributions for all parameters of the model.

We set up assuming a variance of u being 1. In the event of heteroscedastic errors, on the other hand, the variance is specified as

$\sigma_i^2 = 1 + q_i'v$

The rows of z for the null of $v = 0$ are

$$Z_i = (\hat{u}_i^{(1)}x_i, \hat{\eta}_{2i}, ..., \hat{\eta}_{(J-1)i}, \hat{u}_i^2 q_i) \tag{A.5}$$

Under the null, $\xi \sim \chi^2(k)$

In the case of heteroscedastic ordered probit incorporating the variance function removes the heteroscedasticity; hence there is no need to conduct a formal test of heteroscedasticity.

Appendix B

Chapter 3 Appendix

B.1 Chapter 3 Appendix Tables

Table B.1: **List of Countries Included in the Study**

List of Countries included in the Study			
Albania	Denmark	Laos	Russian Federation
Algeria	Dominica	Latvia	Rwanda
Angola	Dominican Rep.	Lebanon	Saudi Arabia
Antigua & Barbuda	Ecuador	Lesotho	Senegal
Argentina	Egypt	Liberia	Seychelles
Armenia	El Salvador	Lithuania	Sierra Leone
Australia	Equa. Guinea	Luxembourg	Singapore
Austria	Eritrea	Madagascar	Slovakia
Azerbaijan	Estonia	Malawi	Slovenia
Bahamas	Ethiopia	Malaysia	South Africa
Bangladesh	Fiji	Maldives	Spain
Belarus	Finland	Mali	Sri Lanka
Belgium	France	Malta	Sudan
Belize	Gabon	Marshall Islands	Swaziland
Benin	Gambia	Mauritania	Sweden
Bhutan	Georgia	Mauritius	Switzerland
Bolivia	Germany	Mexico	Syrian Arab Rep.
Bosnia & Herzegovina	Ghana	Micronesia, Fe. Sta	TFYR of Macedonia
Botswana	Greece	Mongolia	Tajikistan
Brazil	Grenada	Morocco	Thailand
Bulgaria	Guatemala	Mozambique	Togo
Burkina Faso	Guinea	Namibia	Tonga
Burundi	Guinea-Bissau	Nepal	Trinidad & Tobago
Cambodia	Guyana	Netherlands	Tunisia
Cameroon	Haiti	Nicaragua	Turkey
Canada	Honduras	Niger	Turkmenistan
Cape Verde	Hungary	Nigeria	Uganda
Central African Rep.	Iceland	Norway	Ukraine
Chad	India	Pakistan	United Arab Emirates
Chile	Indonesia	Palau	United Kingdom
China	Ireland	Panama	Tanzania
Colombia	Israel	Papua New Guinea	United States
Comoros	Italy	Paraguay	Uruguay
Congo	Jamaica	Peru	Uzbekistan
Costa Rica	Japan	Philippines	Vanuatu
Croatia	Jordan	Poland	Venezuela
Cyprus	Kazakhstan	Portugal	Viet Nam
Czech Republic	Kenya	Rep. of Moldova	Zambia
Cte d'Ivoire	Korea, Rep. of	Romania	Zimbabwe
Dem. Rep. of Congo	Kyrgyzstan		

Note
Number of countries in the sample is 158

Table B.2: **Determinants of Cross-border Travel: OLS with Heckman Selection with Full Set of Observations**

	2005			2010		
ESTIMATION METHOD	OLS	Selection	Heckman	OLS	Selection	Heckman
Dep. Var.	loutbound	outbound_p	loutbound	loutbound	outbound_p	loutbound
VISA	-0.723***	-0.145***	-1.049***	-1.006***	-0.190***	-0.865***
	(0.060)	(0.031)	(0.069)	(0.072)	(0.036)	(0.068)
LGDP_PC_ORIGIN	0.809***	0.258***	0.646***	0.814***	0.260***	0.606***
	(0.021)	(0.011)	(0.036)	(0.022)	(0.012)	(0.035)
LGDP_PC_DEST	0.707***	0.302***	0.424***	0.755***	0.337***	0.317***
	(0.022)	(0.011)	(0.038)	(0.023)	(0.011)	(0.040)
CONTIGUITY	2.697***	0.216*	1.653***	2.558***	0.211*	1.547***
	(0.299)	(0.122)	(0.173)	(0.300)	(0.123)	(0.169)
LDISTSANCE	-1.482***	-0.545***	-1.119***	-1.520***	-0.548***	-1.028***
	(0.043)	(0.021)	(0.066)	(0.044)	(0.021)	(0.065)
LPOP_ORIGIN	0.774***	0.234***	0.746***	0.780***	0.231***	0.719***
	(0.027)	(0.015)	(0.033)	(0.028)	(0.015)	(0.032)
LPOP_DEST	0.705***	0.288***	0.606***	0.695***	0.265***	0.549***
	(0.022)	(0.012)	(0.040)	(0.023)	(0.012)	(0.036)
LAREA_ORIGIN	0.000	0.027**		0.012	0.029**	
	(0.021)	(0.012)		(0.022)	(0.012)	
LAREA_DEST	-0.178***	-0.070***	-0.018	-0.146***	-0.049***	-0.033**
	(0.019)	(0.011)	(0.018)	(0.020)	(0.011)	(0.017)
COMMON_						
LANGUAGE	1.173***	0.450***	0.756***	1.191***	0.461***	0.548***
	(0.076)	(0.041)	(0.087)	(0.079)	(0.041)	(0.086)
COLONY	1.296***	0.047	1.009***	1.266***	0.064	0.971***
	(0.341)	(0.127)	(0.166)	(0.346)	(0.128)	(0.156)
WTO	0.261***	0.220***	0.223***	0.402***	0.250***	0.380***
	(0.057)	(0.032)	(0.071)	(0.059)	(0.032)	(0.071)
SCHENGEN_ORIGIN	0.374***	0.140***	0.159**	0.468***	0.175***	0.122*
	(0.095)	(0.042)	(0.068)	(0.097)	(0.042)	(0.066)
SCHENGEN_DEST	-1.868***	-1.195***	0.133	-2.104***	-1.254***	0.285*
	(0.128)	(0.059)	(0.148)	(0.132)	(0.060)	(0.148)
LAMBDA			-0.683***			-0.932***
			(0.210)			(0.203)
CONSTANT	-17.19***	-7.84***	-13.23***	-17.66***	-8.02***	-10.95***
	(0.602)	(0.301)	(1.205)	(0.631)	(0.305)	(1.174)
OBSERVATIONS	11637	11637	4139	11637	11637	4139
R-SQUARED	0.517		0.754	0.512		0.737

Note
Robust Standard errors in parentheses.
***, **, * indicate Significance at 1%, 5%, 10% level
outbound_p is a dummy variable that takes one for non-zero outbound travel, and zero for zero outbound travel

Table B.3: **Durban-Wu-Hausman Test of Exogeneity of Visas**

DWH Test of Exogeneity of Visas		
DEP. VAR	LOUTBOUND 2005	LOUTBOUND 2010
VISA	-0.874***	-1.166***
	(0.102)	(0.107)
VISA_RES	-2.376***	-0.927***
	(0.231)	(0.240)
LGDP_PC_ORIGIN	0.518***	0.574***
	(0.029)	(0.029)
LGDP_PC_DEST	0.216***	0.158***
	(0.033)	(0.038)
OBSERVATIONS	4139	4139
R-squared	0.267	0.231

Note
Durban-Wu-Hausman test of exogeneity of visas based on the Davidson and MacKinnon (1993) augmented regression
Robust Standard errors in parentheses.

Table B.4: **Test of Orthogonality of the Instrument**

	Without visa		With visa	
	2005	2010	2005	2010
ESTIMATION METHOD	OLS	OLS	OLS	OLS
DEP.VAR	LOUTBOUND	LOUTBOUND	LOUTBOUND	LOUTBOUND
VISA			-1.087***	-0.946***
			(0.067)	(0.065)
UN_VOTE_AFFINITY	0.393***	0.290***	0.147	0.082
	(0.091)	(0.090)	(0.096)	(0.085)
LGDP_PC_ORIGIN	0.868***	0.835***	0.754***	0.743***
	(0.021)	(0.022)	(0.022)	(0.023)
LGDP_PC_DEST	0.595***	0.568***	0.536***	0.480***
	(0.020)	(0.020)	(0.020)	(0.022)
CONTIGUITY	1.788***	1.636***	1.659***	1.538***
	(0.187)	(0.186)	(0.179)	(0.176)
LDISTSANCE	-1.388***	-1.378***	-1.308***	-1.299***
	(0.037)	(0.037)	(0.035)	(0.036)
LPOP_ORIGIN	0.851***	0.839***	0.844***	0.832***
	(0.026)	(0.026)	(0.025)	(0.026)
LPOP_DEST	0.697***	0.685***	0.714***	0.685***
	(0.020)	(0.019)	(0.019)	(0.019)
LAREA_ORIGIN	0.021	0.039*	0.006	0.023
	(0.022)	(0.022)	(0.021)	(0.022)
LAREA_DEST	-0.102***	-0.116***	-0.044***	-0.057***
	(0.016)	(0.015)	(0.016)	(0.016)
COMMON_LANGUAGE	0.983***	0.853***	0.936***	0.792***
	(0.068)	(0.068)	(0.065)	(0.067)
COLONY	1.066***	0.998***	1.007***	0.973***
	(0.176)	(0.169)	(0.169)	(0.160)
WTO	0.608***	0.649***	0.300***	0.498***
	(0.067)	(0.068)	(0.068)	(0.066)
SCHENGEN_ORIGIN	0.193***	0.220***	0.213***	0.224***
	(0.071)	(0.069)	(0.069)	(0.067)
SCHENGEN_DEST	-0.365***	-0.283***	-0.332***	-0.337***
	(0.090)	(0.089)	(0.089)	(0.088)
CONSTANT	-18.151***	-17.208***	-17.176***	-15.997***
	(0.578)	(0.580)	(0.557)	(0.576)
OBSERVATIONS	4139	4139	4139	4139
R-SQUARED	0.735	0.722	0.754	0.736

Note
Robust Standard errors in parentheses.
***, **, * indicate Significance at 1%, 5%, 10% level

Table B.5: **Determinants of Visa Policies: LPM (First Stage)**

	2005	2010
DEP. VAR.	Visa (1)	Visa (2)
UN_VOTE_AFFINITY	-0.224***	-0.219***
	(0.020)	(0.021)
LGDP_PC_ORIGIN	-0.095***	-0.090***
	(0.009)	(0.009)
LGDP_PC_DEST	0.050***	0.060***
	(0.004)	(0.004)
CONTIG	-0.119***	-0.104***
	(0.036)	(0.038)
LDISTW	0.053***	0.069***
	(0.019)	(0.018)
LPOP_ORIGIN	0.002	-0.001
	(0.010)	(0.009)
LPOP_DEST	0.027***	0.008
	(0.010)	(0.009)
LAREA_ORIGIN	-0.012**	-0.016***
	(0.005)	(0.005)
LAREA_DEST	-0.025	-0.052**
	(0.023)	(0.023)
COMMON_LANGUAGE	-0.025	-0.052**
	(0.023)	(0.023)
COLONY	-0.055	-0.026
	(0.041)	(0.041)
WTO	-0.275***	-0.153***
	(0.016)	(0.016)
SCHENGEN_ORIGIN	0.025	0.010
	(0.017)	(0.018)
SCHENGEN_DEST	-0.012	-0.089**
	(0.040)	(0.039)
LAMBDA	0.068	0.049
	(0.057)	(0.052)
CONSTANT	0.547*	1.021***
	(0.316)	(0.316)
OBSERVATIONS	4139	4139
R-SQUARED	0.379	0.420
CRAGG-DONALD STATISTIC	66.04	67.99
ANDERSON LM STATISTIC	109.5	100.8

Note
Robust Standard errors in parentheses.
***, **, * indicate Significance at 1%, 5%, 10% level

Table B.6: **Determinants of Travel: Regression by OLS by Continent**

	Africa	Asia	Europe	Caribbean	South America
VISA	-1.155***	-1.362***	-0.827***	-0.406***	-0.706***
	(0.114)	(0.148)	(0.062)	(0.101)	(0.104)
CONTROLS	Yes	Yes	Yes	Yes	Yes
OBSERVATIONS	1640	766	3614	1000	872
R-squared	0.663	0.684	0.701	0.860	0.793

Table B.7: **Determinants of Travel: OLS with Heckman by Continent**

	Africa	Asia	Europe	Caribbean	South America
VISA	-1.105***	-1.176***	-0.741***	-0.400***	-0.615***
	(0.114)	(0.16)	(0.07)	(0.101)	(0.111)
LAMBDA	2.185***	-1.036***	-0.525***	0.199	-0.897**
	(0.456)	(0.349)	(0.190)	(0.302)	(0.378)
CONTROLS	Yes	Yes	Yes	Yes	Yes
OBSERVATIONS	1638	760	3614	1000	872
R-squared	0.666	0.685	0.702	0.860	0.793

Table B.8: **Determinants of Cross-border Travel: Poisson and IV-Poisson**

ESTIMATION METHOD	POISSON		IVPOISSON	
	2005	2010	2005	2010
DEP.VAR	OUTBOUND	OUTBOUND	OUTBOUND	OUTBOUND
VISA	-1.679***	-0.988***	-3.779***	-1.268***
	(0.000)	(0.000)	(0.002)	(0.001)
LGDP_PC_ORIGIN	0.598***	0.617***	0.567***	0.635***
	(0.000)	(0.000)	(0.000)	(0.000)
LGDP_PC_DEST	0.287***	0.249***	0.160***	0.220***
	(0.000)	(0.000)	(0.000)	(0.000)
CONTIGUITY	0.902***	0.895***	0.468***	0.715***
	(0.000)	(0.000)	(0.000)	(0.000)
LDISTSANCE	-1.283***	-1.319***	-1.110***	-1.311***
	(0.000)	(0.000)	(0.000)	(0.000)
LPOP_ORIGIN	0.828***	0.616***	0.676***	0.553***
	(0.000)	(0.000)	(0.000)	(0.000)
LPOP_DEST	0.565***	0.610***	0.437***	0.565***
	(0.000)	(0.000)	(0.000)	(0.000)
LAREA_ORIGIN	-0.027***	0.160***	0.062***	0.193***
	(0.000)	(0.000)	(0.000)	(0.000)
LAREA_DEST	0.260***	0.131***	0.483***	0.197***
	(0.000)	(0.000)	(0.000)	(0.000)
COMMON_ LANGUAGE	-0.062***	-0.049***	-0.662***	-0.187***
	(0.000)	(0.000)	(0.000)	(0.000)
COLONY	0.975***	0.689***	0.745***	0.675***
	(0.000)	(0.000)	(0.000)	(0.000)
WTO	-0.481***	-0.118***	-0.495***	0.037***
	(0.000)	(0.000)	(0.000)	(0.000)
SCHENGEN_ORIGIN	-0.366***	-0.274***	-0.703***	-0.371***
	(0.000)	(0.000)	(0.000)	(0.000)
SCHENGEN_DEST	0.300***	0.148***	0.195***	0.151***
	(0.000)	(0.000)	(0.000)	(0.000)
CONSTANT	-12.502***	-10.199***	-10.340***	-9.377***
	(0.001)	(0.001)	(0.001)	(0.001)
OBSERVATIONS	11637	11637	11637	11637

Note
Standard errors in parentheses.
***, **, * indicate Significance at 1%, 5%, 10% level

Table B.9: **Determinants of Cross-border Travel: Zero Inflated Poisson and IV-Poisson**

ESTIMATION METHOD	ZERO INFLATED POISSON		ZERO INFLATED IVPOISSON	
	2005	2010	2005	2010
DEP.VAR	OUTBOUND	OUTBOUND	OUTBOUND	OUTBOUND
VISA	-1.602***	-0.890***	-2.069***	0.229***
	(0.000)	(0.000)	(0.002)	(0.001)
LGDP_PC_ORIGIN	0.560***	0.558***	0.586***	0.615***
	(0.000)	(0.000)	(0.000)	(0.000)
LGDP_PC_DEST	0.267***	0.252***	0.220***	0.329***
	(0.000)	(0.000)	(0.000)	(0.000)
CONTIGUITY	0.931***	1.081***	0.857***	1.146***
	(0.000)	(0.000)	(0.000)	(0.000)
LDISTSANCE	-1.202***	-1.075***	-1.043***	-1.129***
	(0.000)	(0.000)	(0.000)	(0.000)
LPOP_ORIGIN	0.180***	0.124***	0.094***	0.048***
	(0.000)	(0.000)	(0.000)	(0.000)
LPOP_DEST	0.267***	0.274***	0.184***	0.144***
	(0.000)	(0.000)	(0.000)	(0.000)
LAREA_DEST	0.255***	0.148***	0.374***	0.122***
	(0.000)	(0.000)	(0.000)	(0.000)
COMMON_ LANGUAGE	-0.000***	-0.004***	-0.370***	0.024***
	(0.000)	(0.000)	(0.000)	(0.000)
COLONY	0.911***	0.678***	0.793***	0.727***
	(0.000)	(0.000)	(0.000)	(0.000)
WTO	-0.520***	-0.240***	-0.301***	-0.009***
	(0.000)	(0.000)	(0.000)	(0.000)
SCHENGEN_ORIGIN	-0.390***	-0.396***	-0.648***	-0.402***
	(0.000)	(0.000)	(0.000)	(0.000)
SCHENGEN_DEST	0.396***	0.285***	0.392***	0.426***
	(0.000)	(0.000)	(0.000)	(0.000)
CONSTANT	-10.717***	-9.186***	-9.655***	-9.087***
	(0.001)	(0.001)	(0.001)	(0.001)
INFLATE				
LAREA_ORIGIN	-0.179***	-0.180***	-0.179***	-0.180***
	(0.010)	(0.010)	(0.010)	(0.010)
OBSERVATIONS	11637	11637	11637	11637

Note
Standard errors in parentheses.
***, **, * indicate Significance at 1%, 5%, 10% level

Table B.10: **Determinants of Travel: Poisson Estimation by Continent**

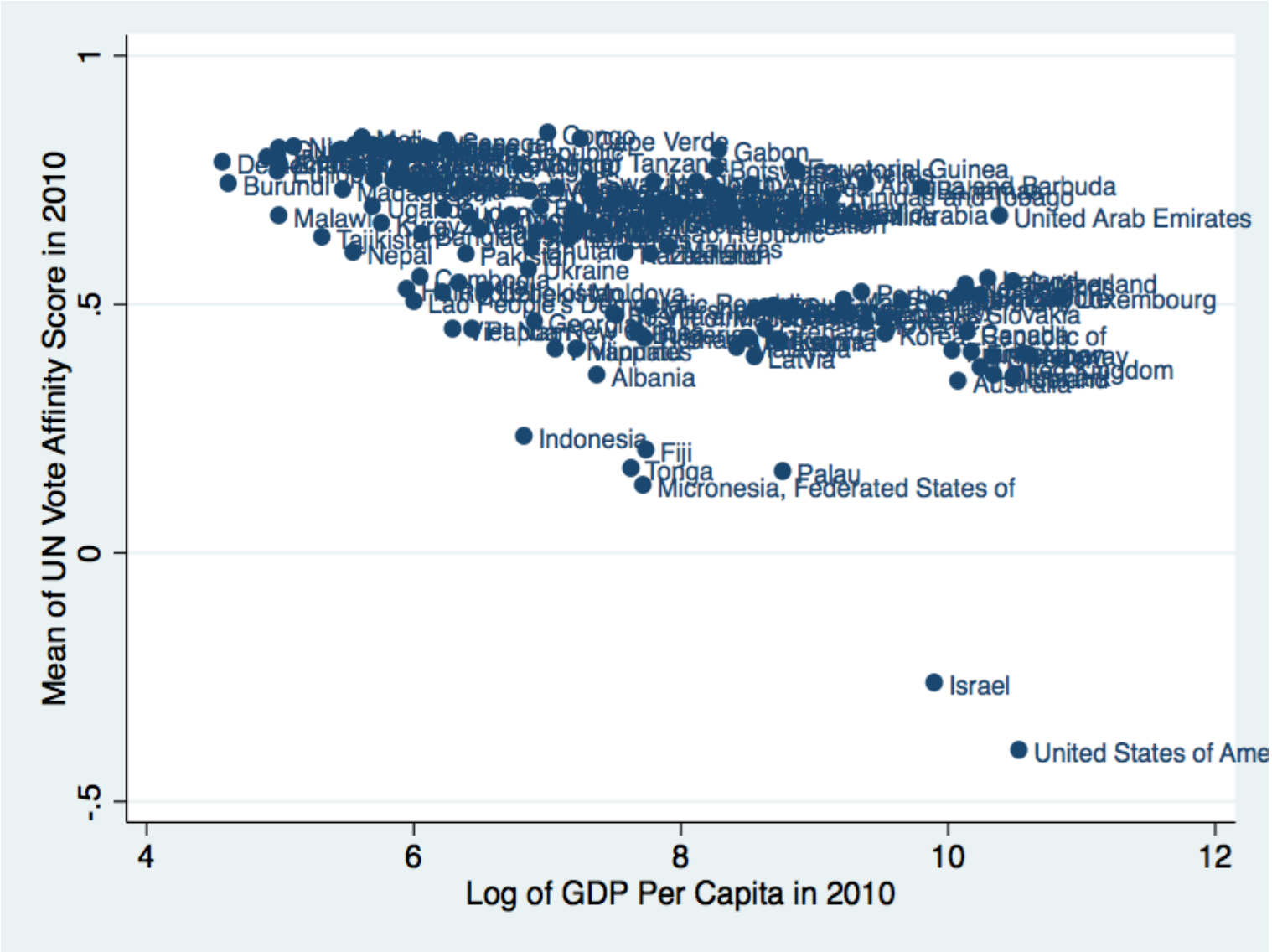
	Poisson				
	Africa	Asia	Europe	Caribbean	South America
DEP.VAR	outbound	outbound	outbound	outbound	outbound
VISA	-1.049***	-1.116***	-1.692***	0.026	-1.540***
	(0.295)	(0.185)	(0.197)	(0.087)	(0.296)
CONTROLS	Yes	Yes	Yes	Yes	Yes
OBSERVATIONS	5832	2104	7489	4176	3054

Note
Robust Standard errors in parentheses.
***, **, * indicate Significance at 1%, 5%, 10% level

Table B.11: **Determinants of Travel: Zero Inflated Poisson Estimation by Continent**

	Zero Inflated Poisson				
	Africa	Asia	Europe	Caribbean	South America
DEP.VAR.	outbound	outbound	outbound	outbound	outbound
VISA	-0.908***	-0.966***	-1.649***	0.015	-1.228***
	(0.307)	(0.171)	(0.200)	(0.082)	(0.286)
INFLATE					
LAREA_O	-0.127***	-0.221***	-0.178***	-0.346***	-0.210***
	(0.018)	(0.026)	(0.016)	(0.019)	(0.029)
CONTROLS	Yes	Yes	Yes	Yes	Yes
OBSERVATIONS	5832	2104	7480	4174	3054

Note
Robust Standard errors in parentheses.
***, **, * indicate Significance at 1%, 5%, 10% level



Note: Log of GDP per capital (at 2005 constant prices) and Mean UN Voting Affinity Scores for the main sample fo countries: 2010.
Source: Computed from World Bank (2013) and Lawson and Lemke (2012).

Figure B.1: **Scatter Plot of GDP per capita and Voting Affinity Scores: 2010**

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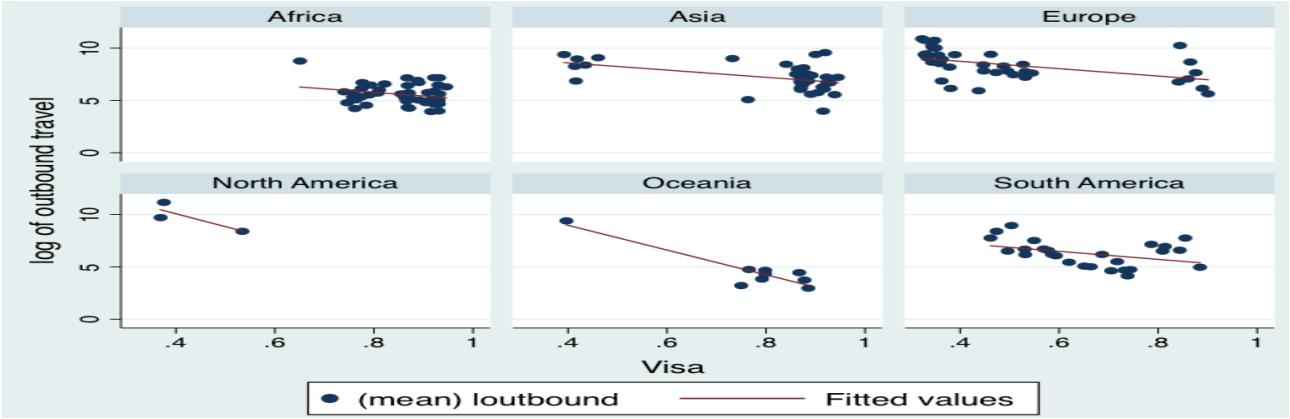

Figure B.2: Visa and Travel within Continents

Appendix C

Chapter 4 Appendix

C.1 VWP Qualifying Criteria

In order to qualify for the VWP program, a country must (Siskin (2014))

- offer reciprocal privileges to US citizens;
- a non-immigrant refusal rate of less than 3% for the previous year or an average of no more than 2% over the past two years with neither year going above 2.5%;
- issue machine-readable passports (all aliens entering under the VWP must possess a machine-readable passport);
- certify that it has established a program to issue to its nationals machine-readable passports that are tamper-resistant and incorporate a biometric identifier (all passports issued after October 26, 2006, presented by aliens entering under the VWP have to be machine-readable and contain a biometric identifier);
- certify that it is developing a program to issue tamper-resident, machine-readable visa documents that incorporate biometric identifiers which are verifiable at the countrys port of entry;
- enter into an agreement with the United States to report or make available through International Criminal of any citizen, former citizen, or national against whom a final order of removal is issued no later than three weeks after the order is issued;
- enter into an agreement with the United States to share information regarding whether a national of that country traveling to the United States represents a threat to U.S. security or welfare; and
- be determined, by the Secretary of Homeland Security, in consultation with the Secretary of State, not to compromise the law enforcement or security interests of the United States by its inclusion in the program.

Table C.1: **List of Eligible countries for VWP Countries and Date of Admission as of June 2015**

Current list of VWP countries (June, 2015)	
Andorra (1991)	Liechtenstein (1991)
Australia (1996)	Lithuania (2008)
Austria (1991)	Luxembourg (1991)
Belgium (1991)	Malta (2008)
Brunei (1993)	Monaco (1991)
Chile (2014)	Netherlands (1989)
Czech Republic (2008)	New Zealand (1991)
Denmark (1991)	Norway (1991)
Estonia (2008)	Portugal (1999)
Finland (1991)	San Marino (1991)
France (1989)	Singapore (1999)
Germany (1989)	Slovakia (2008)
Greece (2010)	Slovenia (1997)
Hungary (2008)	South Korea (2008)
Iceland (1991)	Spain (1991)
Ireland (1995)	Sweden (1989)
Italy (1989)	Switzerland (1989)
Japan (1988)	Taiwan (2012)
Latvia (2008)	United Kingdom (1988)

Note
Argentina and Uruguay were initially admitted to the VWP in 1996 and 1999 respectively; however both were withdrawn in 2002 and 2003 respectively
Source
United States Travel Authorization Application Website, www.esta.us, accessed 30 June, 2015

C.2 Chapter 4 Appendix Tables

Table C.2: **Sample of Countries in Treatment and Comparison Groups: A**

Countries entered the VWP in 2008 (Treated)	Roadmap countries in 2008 (comparison 1
Czech Rep.	Brazil
Estonia	Bulgaria
Hungary	Cyprus
S.Korea	Israel
Latvia	Malaysia
Lithuania	Poland
Malta	Romania
Slovakia	Turkey
	Uruguay

Table C.3: **Sample of Countries in Treatment and Comparison Group: B**

Countries not in the VWP currently (Comparison 2)			
Afghanistan	Ecuador	Mauritania	Tunisia
Albania	Egypt	Mauritius	Turkey
Algeria	El Salvador	Mexico	Turkmenistan
Angola	Eq. Guinea	Morocco	Tuvalu
Antig & Barb	Eritrea	Mozambique	Uganda
Armenia	Ethiopia	Namibia	Ukraine
Azerbaijan	Fiji	Nepal	UAE
Bahamas	Gabon	Nicaragua	Tanzania
Bahrain	Gambia	Niger	Uruguay
Bangladesh	Georgia	Nigeria	Uzbekistan
Barbados	Ghana	Oman	Vanuatu
Belarus	Grenada	Pakistan	Venezuela
Benin	Guatemala	Panama	Viet Nam
Bermuda	Guinea	Papua New Guinea	Yemen
Bhutan	Guinea-Bissau	Paraguay	Zambia
Bolivia	Guyana	Peru	Zimbabwe
Bos and Herze	Haiti	Philippines	
Botswana	Honduras	Poland	
Brazil	Hong Kong	Qatar	
Bulgaria	India	Republic of Moldova	
Burkina Faso	Indonesia	Romania	
Burundi	Iran	Russia	
Cambodia	Iraq	Rwanda	
Cameroon	Israel	St. Kitts & Nevis	
Canada	Jordan	Saint Lucia	
Cape Verde	Kazakhstan	Samoa	
C. African Republic	Kenya	Sao Tome and Principe	
Chad	Kiribati	S. Arabia	
Chile	Kuwait	Senegal	
China	Kyrgyzstan	Seychelles	
Colombia	Lao	Sierra Leone	
Comoros	Lebanon	S.Africa	
Congo	Lesotho	Sri Lanka	
Costa Rica	Liberia	Sudan	
Cte d'Ivoire	Libya	Suriname	
Croatia	Macao	Swaziland	
Cuba	Madagascar	Tajikistan	
Cyprus	Malawi	Thailand	
Djibouti	Malaysia	Togo	
Dominica	Maldives	Tonga	
Dom Rep	Mali	Trin & Tob	

Table C.4: **The Rest of the World Except the 2008 VWP**

The Rest of the World except countries entered the VWP in 2008 (Comparison 3			
Afghanistan	Cyprus	Kuwait	St. Kitts & Nevis
Albania	Denmark	Kyrgyzstan	Saint Lucia
Algeria	Djibouti	Lao	Samoa
Angola	Dominica	Lebanon	Sao Tome and Principe
Antig & Barb	Dom Rep	Lesotho	S.Arabia
Armenia	Ecuador	Liberia	Senegal
Australia	Egypt	Libya	Seychelles
Austria	El Salvador	Luxembourg	Sierra Leone
Azerbaijan	Equat. Guinea	Macao, China	Singapore
Bahamas	Eritrea	Madagascar	Slovenia
Bahrain	Ethiopia	Malawi	South Africa
Bangladesh	Fiji	Malaysia	Spain
Barbados	Finland	Maldives	Sri Lanka
Belarus	France	Mali	Sudan
Belgium	Gabon	Mauritania	Suriname
Benin	Gambia	Mauritius	Swaziland
Bermuda	Georgia	Mexico	Sweden
Bhutan	Germany	Morocco	Switzerland
Bolivia	Ghana	Mozambique	Tajikistan
Bos and Herze	Greece	Namibia	Thailand
Botswana	Grenada	Nepal	Togo
Brazil	Guatemala	Netherlands	Tonga
Brunei Darussalam	Guinea	New Zealand	Trin & Tob
Bulgaria	Guinea-Bissau	Nicaragua	Tunisia
Burkina Faso	Guyana	Niger	Turkey
Burundi	Haiti	Nigeria	Turkmenistan
Cambodia	Honduras	Norway	Tuvalu
Cameroon	Hong Kong	Oman	Uganda
Canada	Iceland	Pakistan	Ukraine
Cape Verde	India	Panama	UAE
C.African Republic	Indonesia	Papua New Guinea	UK
Chad	Iran	Paraguay	Tanzania
Chile	Iraq	Peru	Uruguay
China	Ireland	Philippines	Uzbekistan
Colombia	Israel	Poland	Vanuatu
Comoros	Italy	Portugal	Venezuela
Congo	Japan	Qatar	Viet Nam
Costa Rica	Jordan	Republic of Moldova	Yemen
Cte d'Ivoire	Kazakhstan	Romania	Zambia
Croatia	Kenya	Russia	Zimbabwe
Cuba	Kiribati	Rwanda	

Table C.5: **Summary Statistics: Treatment (2008 VWP) and Comparison (2008 Roadmap)**

Variable	Category	Mean	SD	Min.	Max.	Obs.
TREAT	overall	0.47	0.50	0.00	1.00	N = 153
	between		0.51	0.00	1.00	n = 17
	within		0.00	0.47	0.47	T = 9
TREAT*POST2008	overall	0.21	0.41	0.00	1.00	N = 153
	between		0.23	0.00	0.44	n = 17
	within		0.34	-0.24	0.76	T = 9
LINBOUND	overall	10.68	1.53	8.23	14.40	N = 153
	between		1.55	8.52	13.66	n = 17
	within		0.26	9.94	11.48	T = 9
LRGDP Per Capita	overall	9.17	0.49	8.16	10.06	N = 153
	between		0.5	8.35	9.96	n = 17
	within		0.09	8.95	9.38	T = 9
LEXCHAGERATE	overall	0.45	0.25	-0.1	1.11	N = 153
	between		0.22	0.04	0.91	n = 17
	within		0.13	0.08	0.98	T = 9
LPOP	overall	15.95	1.59	12.90	19.11	N = 153
	between		1.63	12.92	19.07	n = 17
	within		0.03	15.88	16.03	T = 9
LDIST	overall	9.11	0.16	8.97	9.61	N =153
	between		0.16	8.97	9.61	n = 17
	within		0.00	9.11	9.11	T = 9

Table C.6: **Summary Statistics: Treatment (2008 VWP) and Comparison (The Rest of the World not in the VWP)**

Variable	Category	Mean	SD	Min.	Max.	Obs.
TREAT	overall	0.05	0.23	0.00	1.00	N = 1318
	between		0.23	0.00	1.00	n = 147
	within		0.00	0.05	0.05	T = 9
TREAT*POST2008	overall	0.02	0.15	0.00	1.00	N = 1318
	between		0.10	0.00	0.44	n = 147
	within		0.12	-0.42	0.58	T = 9
LINBOUND	overall	8.96	2.43	1.79	16.94	N = 1318
	between		2.42	2.82	16.70	n = 147
	within		0.31	7.28	10.38	T = 9
LRGDP Per Capita	overall	7.76	1.4	5	11.32	N = 1318
	between		1.4	5	11.25	n = 147
	within		0.10	7	8.17	T = 9
LEXCHAGERATE	overall	0.78	0.38	-0.47	1.89	N = 1318
	between		0.35	-0.45	1.52	n = 147
	within		0.15	0.26	1.44	T = 9
LPOP	overall	15.61	2.05	9.17	21.02	N = 1318
	between		2.05	9.19	21.00	n = 147
	within		0.06	15.03	16.07	T = 9
LDIST	overall	9.10	0.47	7.64	9.71	N = 1318
	between		0.47	7.64	9.71	n = 147
	within		0.00	9.10	9.10	T = 9

Table C.7: **Summary Statistics: Treatment (2008 VWP) and Comparison (The Rest of the World except the Treatment Group)**

Variable	Category	Mean	SD	Min.	Max.	Obs.
TREAT	overall	0.05	0.23	0.00	1.00	N = 1318
	between		0.23	0.00	1.00	n =147
	within		0.00	0.05	0.05	T = 9
TREAT*POST2008	overall	0.02	0.15	0.00	1.00	N = 1318
	between		0.10	0.00	0.44	n = 147
	within		0.12	-0.42	0.58	T = 9
LINBOUND	overall	8.96	2.43	1.79	16.94	N = 1318
	between		2.42	2.82	16.70	n = 147
	within		0.31	7.28	10.38	T = 9
LRGDP Per Capita	overall	8.15	1.61	4.97	11.38	N = 1318
	between		1.61	5	11.3	n = 147
	within		0.1	7.38	8.55	T = 9
LEXCHAGERATE	overall	0.66	0.47	-0.57	1.89	N = 1318
	between		0.45	-0.45	1.52	n = 147
	within		0.15	1.4	1.32	T = 9
LPOP	overall	15.61	2.05	9.17	21.02	N = 1318
	between		2.05	9.19	21.00	n = 147
	within		0.06	15.03	16.07	T = 9
LDIST	overall	9.10	0.47	7.64	9.71	N = 1318
	between		0.47	7.64	9.71	n = 147
	within		0.00	9.10	9.10	T = 9

Table C.8: **Summary Statistics: Treatment (2008 VWP in Europe) and Comparison (2008 Roadmap in Europe)**

Variable	Category	Mean	SD	Min.	Max.	Obs.
TREAT	overall	0.64	0.48	0.00	1.00	N = 99
	between		0.50	0.00	1.00	n = 11
	within		0.00	0.64	0.64	T = 9
TREAT*POST2008	overall	0.28	0.45	0.00	1.00	N = 99
	between		0.22	0.00	0.44	n = 11
	within		0.40	-0.16	0.84	T = 9
LINBOUND	overall	9.89	0.98	8.23	11.90	N = 99
	between		0.99	8.52	11.74	n = 11
	within		0.25	9.19	10.53	T = 9
LRGDP Per Capita	overall	9.2	0.43	8.16	9.8	N = 99
	between		0.43	8.35	9.74	n = 11
	within		0.09	8.99	9.34	T = 9
LEXCHAGERATE	overall	0.44	0.21	-0.004	1.00	N = 99
	between		0.20	0.08	0.84	n = 11
	within		0.10	0.2	0.70	T = 9
LPOP	overall	15.31	1.30	12.90	17.47	N = 99
	between		1.36	12.92	17.46	n = 11
	within		0.02	15.24	15.37	T = 9
LDIST	overall	9.05	0.07	8.97	9.23	N = 99
	between		0.08	8.97	9.23	n = 11
	within		0.00	9.05	9.05	T = 9

Table C.9: **Determinants of Inbound Travel (2004-2012): Diff-in-Diff Estimation - Pre and Post-program Averages**

VARIABLES	WORLDWIDE	EUROPE		
TREATMENT (V)	2008 VWP	2008 VWP	2008 VWP	2008 VWP EUROPE
COMPARISON	2008 ROADMAP	NON-VWP	REST OF THE WORLD	2008 EUROPE ROADMAP
DEP. VARIABLE	Linbound	Linbound	Linbound	Linbound
	(1)	(2)	(3)	(4)
V_POST2008	0.355***	0.335***	0.339***	0.382**
	(0.100)	(0.104)	(0.103)	(0.128)
LRGDP Per Capita	0.105	0.641**	0.624**	0.228
	(0.680)	(0.287)	(0.278)	(0.874)
LEXCHANGE RATE	-0.997*	-0.523**	-0.505**	-0.329
	(0.547)	(0.250)	(0.236)	(0.988)
LPOPULATION	0.953	1.14***	1.238**	0.995
	(1.486)	(0.255)	(0.226)	(2.522)
OBSERVATIONS	34	294	342	22
R-SQUARED (within)	0.645	0.453	0.441	0.605
SIGMA	0.718	1.811	1.822	0.502
SIGMA_E	0.209	0.265	0.256	0.232

Note
Robust Standard errors in parentheses. SIGMA and SIGMA_E indicate standard deviations of residuals within groups (panel level) and that of overall error term respectively
***, **, * indicate Significance at 1%, 5%, 10% level

C.3 Chapter 4 Appendix Figures

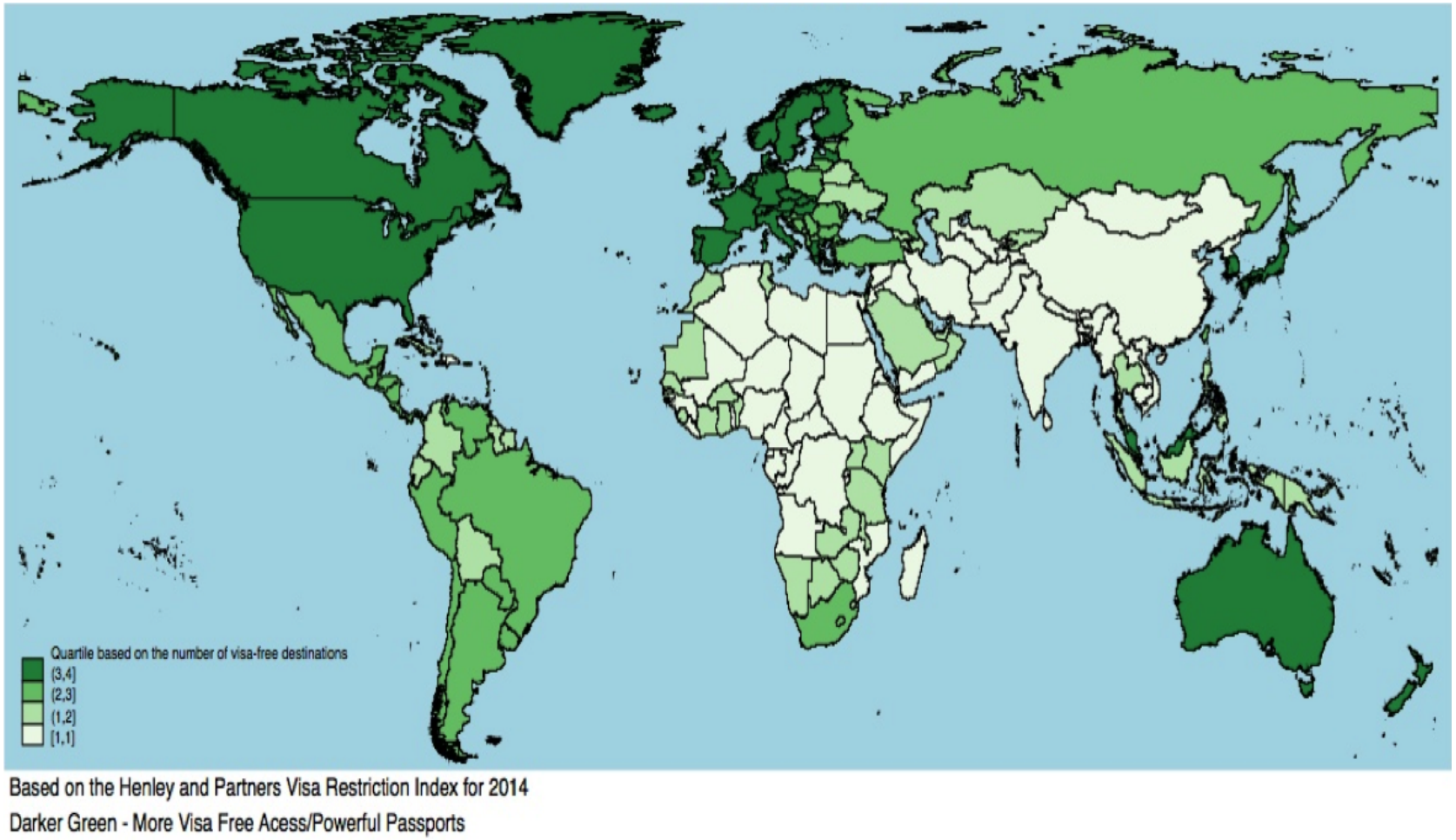

Figure C.1: **The Power of Passports in 2014**

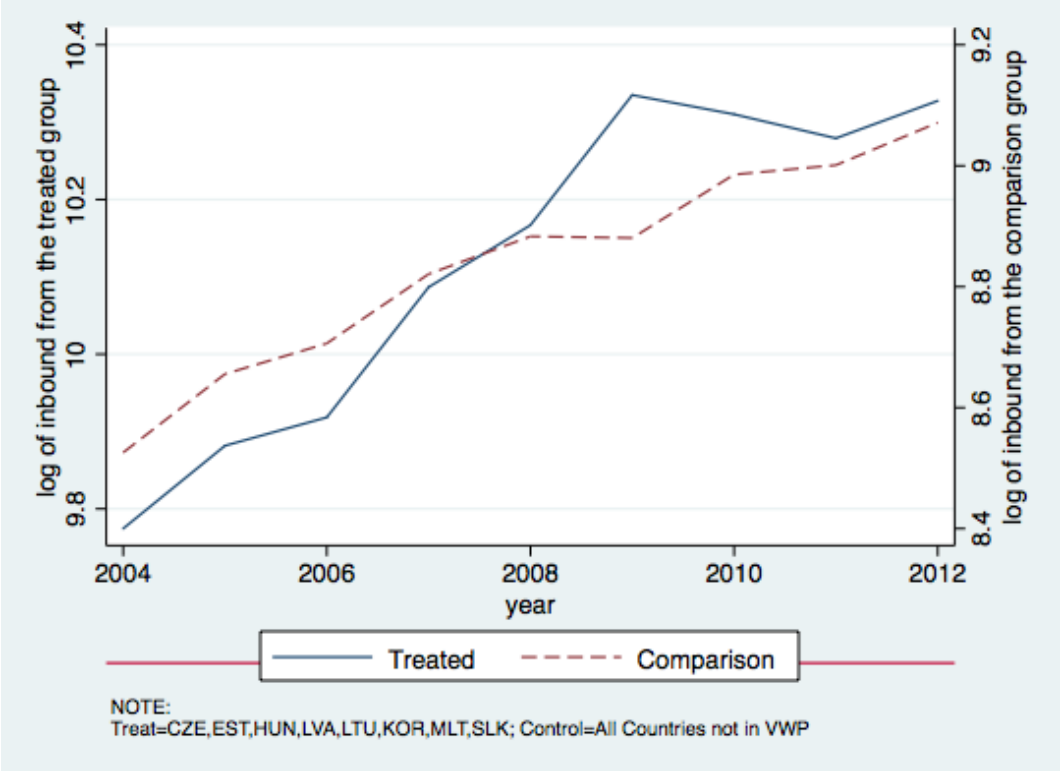

Figure C.2: **Inbound Travel to the US from Treated (2008 VWP) and Comparison (Rest of the World not in VWP)**

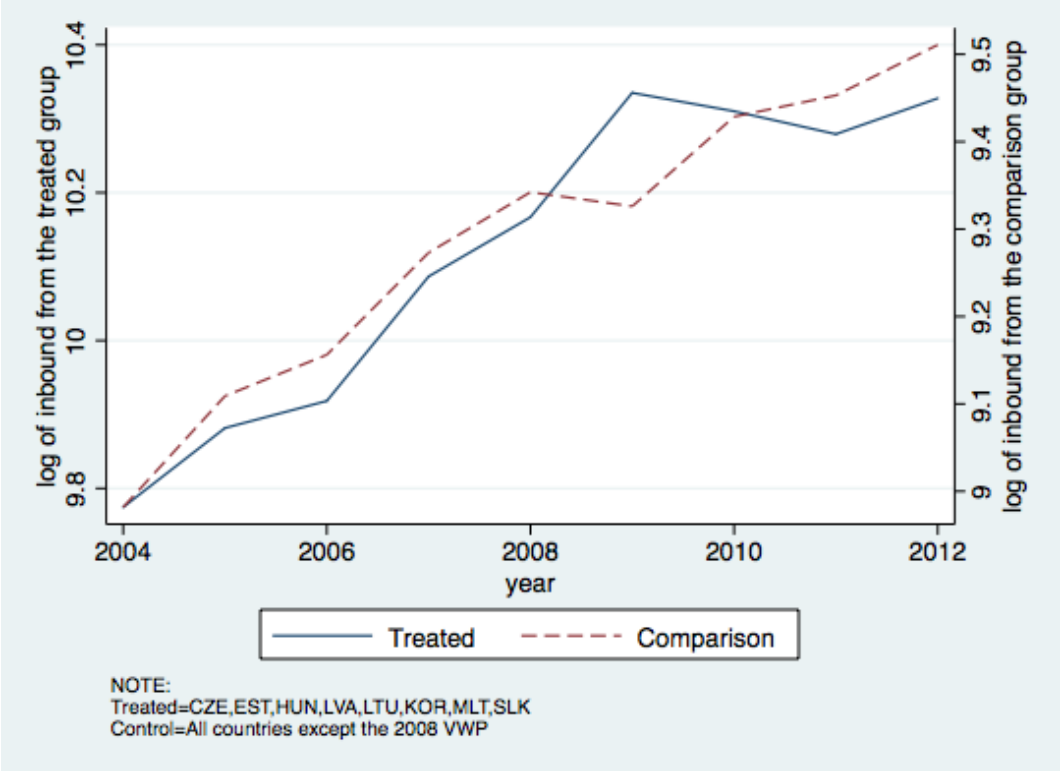

Figure C.3: **Travel to the US from Treated (2008 VWP) and Comparison (Rest of the World including Pre 2008 VWP)**

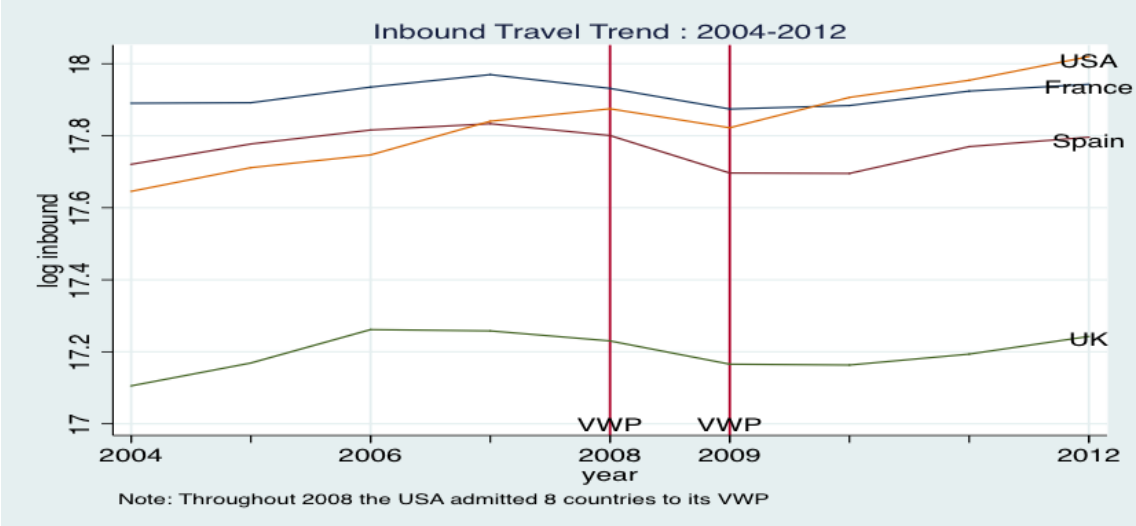

Figure C.4: **Inbound Travel Trends to Selected Developed Countries**